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LITIGATION TECHNICAL SUPPORT AND SERVICES

Rocky Mountain Arsenal

FINAL PHASE I
CONTAMINATION ASSESSMENT REPORT
SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS
(Version 3.1)

February 1988
Contract Number DAAK11-84-D0016
Task Number 1 (Section 36)

PREPARED BY

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
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PREPARED FOR

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR ROCKY MOUNTAIN ARSENAL

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THIS FINAL REPORT DOCUMENTS THE PHASE I CONTAMINATION SURVEY OF SITE 36-7, AN AREA USED FOR INCINERATION, BURIAL OF SOLID WASTES, SANITARY LANDFILL, AND POSSIBLE CHEMICAL DISPOSAL.

65 SAMPLES FROM 21 BORINGS WERE ANALYZED FOR SEMIVOLATILE ORGANICS AND METALS WITH SEPARATE ANALYSES FOR AS, HG, AND DBCP. AS, HG, CD, CU, ZN, ALDRN, DLDRN, AND DIMP WERE DETECTED ABOVE THEIR RESPECTIVE INDICATOR RANGES; HOWEVER, METAL CONCENTRATIONS WERE MOSTLY CONSISTENT WITH NATURALLY OCCURRING LEVELS. A GEOPHYSICAL INVESTIGATION REVEALED SEVERAL MAJOR ANOMALIES.

A PHASE II PROGRAM CONSISTING OF 30 ADDITIONAL BORINGS IS RECOMMENDED. THE VOLUME OF POTENTIALLY CONTAMINATED MATERIAL PRESENT IS ESTIMATED AT 115,000 BANK CUBIC YARDS.

APPENDICES: CHEMICAL NAMES, PHASE I CHEMICAL DATA, COMMENTS AND RESPONSES.

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TABLE OF CONTENTS

Section		Page
	EXECUTIVE SUMMARY	iv
1.0	PHYSICAL SETTING	1
	1.1 LOCATION	1
	1.2 GEOLOGY	1
	1.3 HYDROLOGY	3
2.0	HISTORY	8
3.0	SITE INVESTIGATION	21
	3.1 PREVIOUS SOIL INVESTIGATIONS	21
	3.2 PHASE I SURVEY	21
	3.2.1 Phase I Program	21
	3.2.2 Phase I Field Observations	25
	3.2.3 Geophysical Exploration	26
	3.2.4 Phase I Analyte Levels and Distribution	31
	3.2.5 Phase I Contamination Assessment	47
	3.3 PHASE II SURVEY	49
	3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL	53
4.0	REFERENCES	54

APPENDICES

36-7-A -- CHEMICAL NAMES, METHODS, AND ABBREVIATIONS
36-7-B -- PHASE I CHEMICAL DATA
36-7-C -- COMMENTS AND RESPONSES

LIST OF TABLES

Table		Page
36-7-1	Summary of Analytical Results for Site 36-7	32
36-7-2	Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples	33
36-7-3	Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples	40

LIST OF FIGURES

Figure		Page
36-7-1	Site Location Map, Site 36-7, Rocky Mountain Arsenal	2
36-7-2	Field Boring Profile for Boring 3120	4
36-7-3	Regional Topography, Site 36-7, Rocky Mountain Arsenal	5
36-7-4	Regional Ground Water Flow, Site 36-7, Rocky Mountain Arsenal	6
36-7-5	Phase I Investigation Boring Location Map, Site 36-7	22
36-7-6	Phase I Investigation Geophysical Results Summary, Site 36-7	28
36-7-7	Phase I Investigation Chemical Analysis Results, Site 36-7	38
36-7-8	Proposed Phase II Investigation Boring Location Map and Chemical Analysis Schedule, Site 36-7	50

EXECUTIVE SUMMARY

SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS

Site 36-7 is a large area containing numerous pits, trenches, and other disposal areas. The site is in the north central portion of Section 36 at Rocky Mountain Arsenal (RMA) and was investigated under Task 1 in the summer of 1985. The site includes an incinerator used for the disposal of contaminated and uncontaminated materials as well as disposal trenches and pits and some surface dumping areas. Twenty-one borings were drilled to depths of 5 to 25 feet (ft) and yielded 65 samples.

The following target constituents were detected above their respective indicator ranges: arsenic, mercury, cadmium, copper, zinc, aldrin, dieldrin, and diisopropylmethyl phosphonate (DIMP). Additional compounds were detected in isolated areas. Data from Site 36-7 exhibited wide variations in concentration between adjacent boreholes, indicating a complex distribution of contamination. Extensive geophysical testing conducted after Phase I sampling indicated several major geophysical anomalies, many of which were not penetrated by Phase I borings.

Supporting documentation of disposal practices at this site are available. Visual evidence of disposal at Site 36-7 was also noted in field observations.

A Phase II program consisting of 30 borings yielding 64 samples is recommended to better define the lateral and vertical extent of contamination within the revised site boundaries. A combination of borings, hand-augered samples, and pit/borings will be used to investigate the major disposal areas as defined by geophysical data. The volume of contaminated material in the unsaturated zone at this site has been reduced from 224,000 bank cubic yards (bcy) to 115,000 bcy based on the Phase I analytical and geophysical data.

p. 53 <u>Section 3.4, fourth paragraph, first sentence:</u>

"36-7" has been substituted for "36-17".

Attachment 2

ERRATA

SITE 36-7

FINAL TASK 1, PHASE I CAR (Version 3.1)

p. 10 Section 2.0, second full paragraph, first sentence:
"May 1966" has been substituted for "May 1986".

p. 13 Section 2.0, fourth full paragraph, second sentence:
"smoke or fly ash" has been substituted for "smoke of fly ash".

p. 14 Section 2.0, first paragraph, last sentence should read:
Used brick from the incinerator was disposed of at the sanitary landfill west of Building 347 (Site 2-14a) (Eck, 1982b).

p. 15 Section 2.0, second full paragraph, fifth sentence:
The date of the Culley reference has been changed to 1980.

p. 17 Section 2.0, first full paragraph, fourth sentence:
"methyl cellosolve" has been substituted for "methyl cellusolve".

p. 18 Section 2.0, fifth aerial photograph description, last sentence:
"ponds or trenches" has been substituted for "pods or trenches".

p. 18 Section 2.0, seventh aerial photograph description:
"Site 36-17" has been substituted for "Site 36-18".

p. 18 Section 2.0, last aerial photograph description, second sentence should read: A dump is situated just northwest of the incinerator.

p. 53 Section 3.4, third paragraph, first sentence:
The volume of potentially contaminated soil should be 115,000 bcy in accordance with the table on pg. 17.

SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS

1.0 PHYSICAL SETTING

1.1 LOCATION

Site 36-7 is near the center of Rocky Mountain Arsenal (RMA) in the northwest quarter of Section 36 (Figure 36-7-1). The site is readily visible in aerial photographs and was reportedly used for the destruction of munitions and the burial of solid waste in numerous pits and trenches. The original site boundaries which incorporated a central portion and two outlying areas had an areal extent of 617,000 square feet (ft^2) (RMACCPMT, 1984, RIC#84034R01).

Site boundaries of the central portion of the site were changed based on interpretation of aerial photographs, historical documentation, and field observations. Two additional outlying areas containing ground scars were also added to the Site 36-7 investigation (Figure 36-7-1) as a result of aerial photograph interpretation. The revised areal extent of Site 36-7 was 564,000 ft^2.

1.2 GEOLOGY

Site 36-7 is situated on Pleistocene alluvium which consists of interbedded silty sand, gravel, and clay partly covered by a thin layer of eolian sand and silt. Based on bore logs from nearby ground water monitoring wells and soil borings, the alluvial thickness varies from approximately 2 to 22 ft (Clark, 1985, RIC#85183R01).

The alluvium is underlain by the Denver Formation which is characterized by bentonite-rich clay/shale and compact lenticular sand horizons. Lithologic variations in the Denver Formation include interbedded siltstone, claystone, sandstone, low-grade coal, lignite, and volcaniclastic material (May, 1982, RIC#82295R01; RMACCPMT, 1983, RIC#83326R01; Anderson et al., 1979, RIC#85214R03; Clark, 1985, RIC#85183R01). Based on the logs of nearby monitor wells, a volcaniclastic unit may be projected beneath Site 36-7 (May et al., 1983, RIC#83299R01). Although this unit may sporadically subcrop in the site area, the bulk of the area is thought to be underlain by shale and claystone.

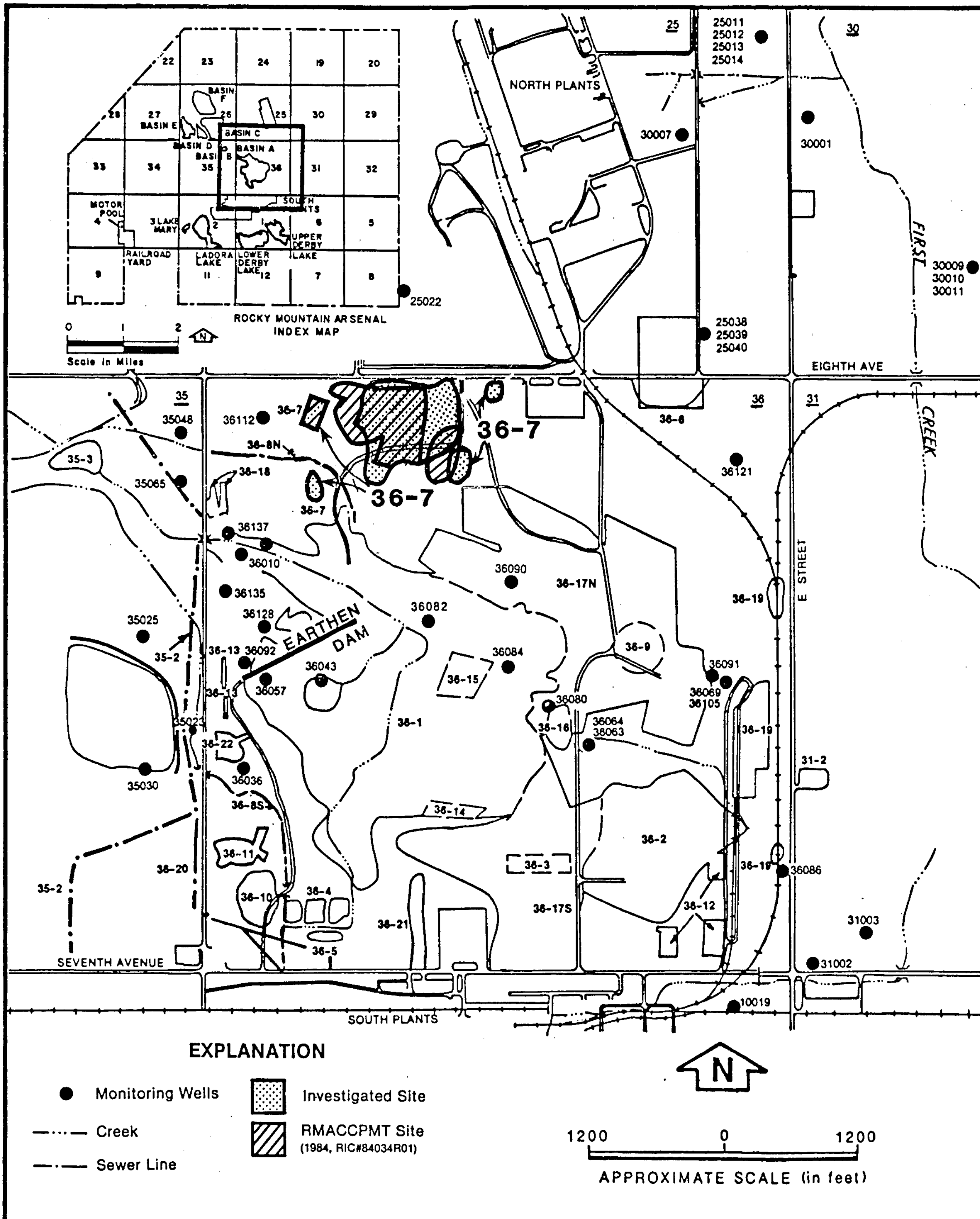

Figure 36-7-1
SITE LOCATION MAP
SITE 36-7
ROCKY MOUNTAIN ARSENAL
SOURCE: ESE, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

Phase I investigation results indicate that the site is underlain by alluvium consisting of interbedded silt, silty sand, and clay. Thin layers of gravel were encountered in Boreholes 3108, 3112, and 3124. The Denver Formation was penetrated by the following five borings:

Boring No.	Depth to Bedrock (ft)	Lithology
3110	10.8	Claystone
3114	7.4	Weathered Claystone
3117	2.2	Weathered Claystone
3120	15.0	Weathered Claystone
3124	14.0	Weathered Claystone

A representative boring log from Site 36-7 is presented in Figure 36-7-2.

1.3 HYDROLOGY

The central portion of Site 36-7 is a topographic high, whereas the outlying areas are relatively flat (Figure 36-7-3). Surface water from most of the site drains toward the Basin A neck area and Section 26. Surface water runoff flows southeast from the southeastern outlying area toward Site 36-17N and east from the northeastern outlying area toward First Creek. The central portion of Site 36-7 has a moderate to severe south-facing slope. No discernable drainage channels exist within the site boundaries. Surface elevations range from approximately 5,240 to 5,285 ft above mean sea level (msl).

The general direction of ground water flow at RMA is northwest. Within Section 36, flow direction varies from northeast to west due to local bedrock influences. The ground water flow beneath Site 36-7 is to the north-northwest (Figure 36-7-4). Water level data generated in March 1986 as part of the Task 4 investigation show the water table elevation to range from 5,228 to 5,217 ft msl or approximately 14 to 65 ft below ground surface across this site (Figure 36-7-4) (ESE, 1986b, RIC#86238R08).

Only one Phase I boring (3122) in Site 36-7 encountered ground water, which was determined to be at a depth of 14.0 ft (5,226 ft msl). This elevation generally agrees with the Task 4 water table elevations (Figure 36-7-4). During the Task 4 Initial Screening Program (ESE, 1986b,RIC#86238R08),

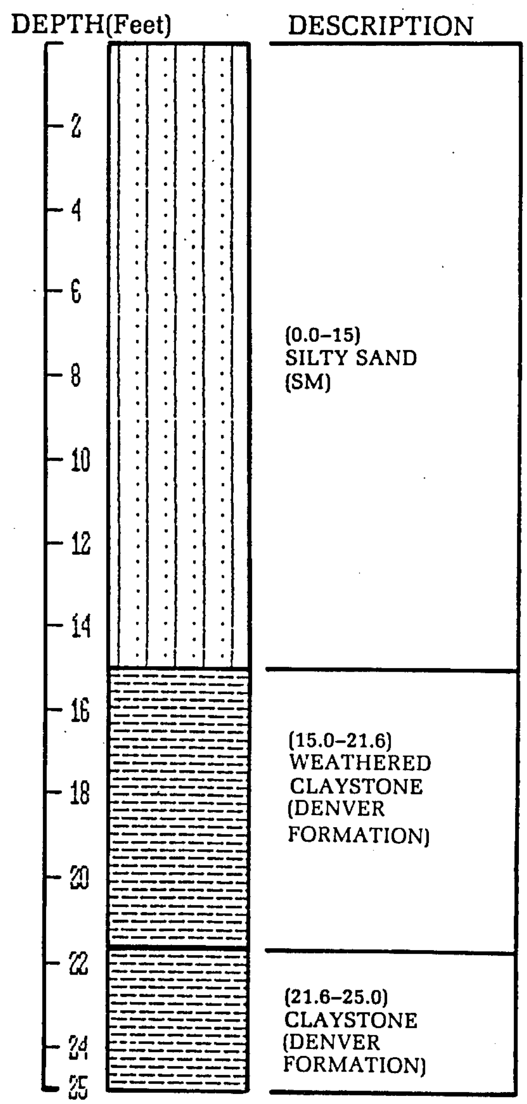

Figure 36-7-2
FIELD BORING PROFILE FOR
BORING 3120

SOURCE: ESE, 1987

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For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

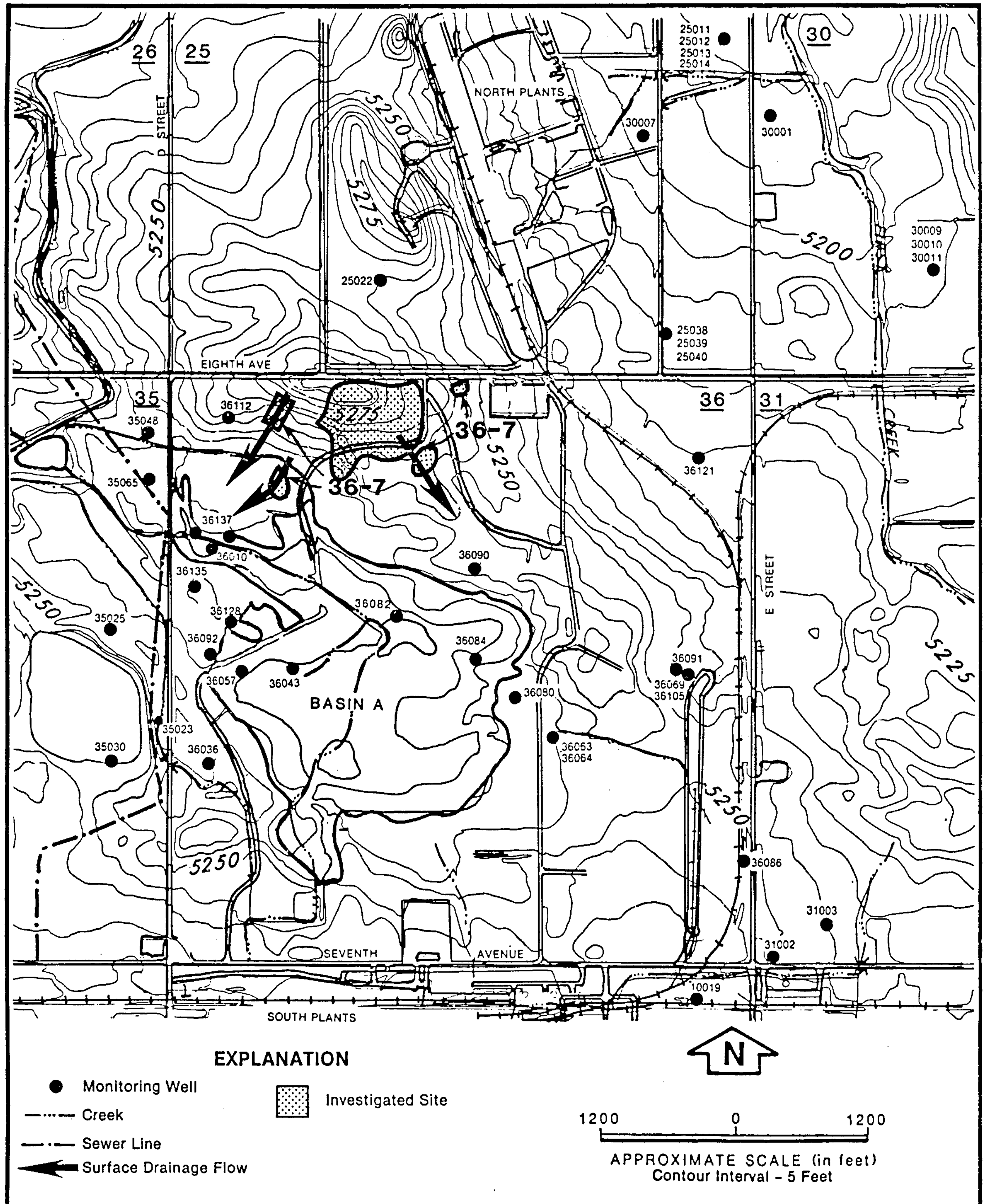

Figure 36-7-3
REGIONAL TOPOGRAPHY
SITE 36-7
ROCKY MOUNTAIN ARSENAL
SOURCE: ESE, 1987

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U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

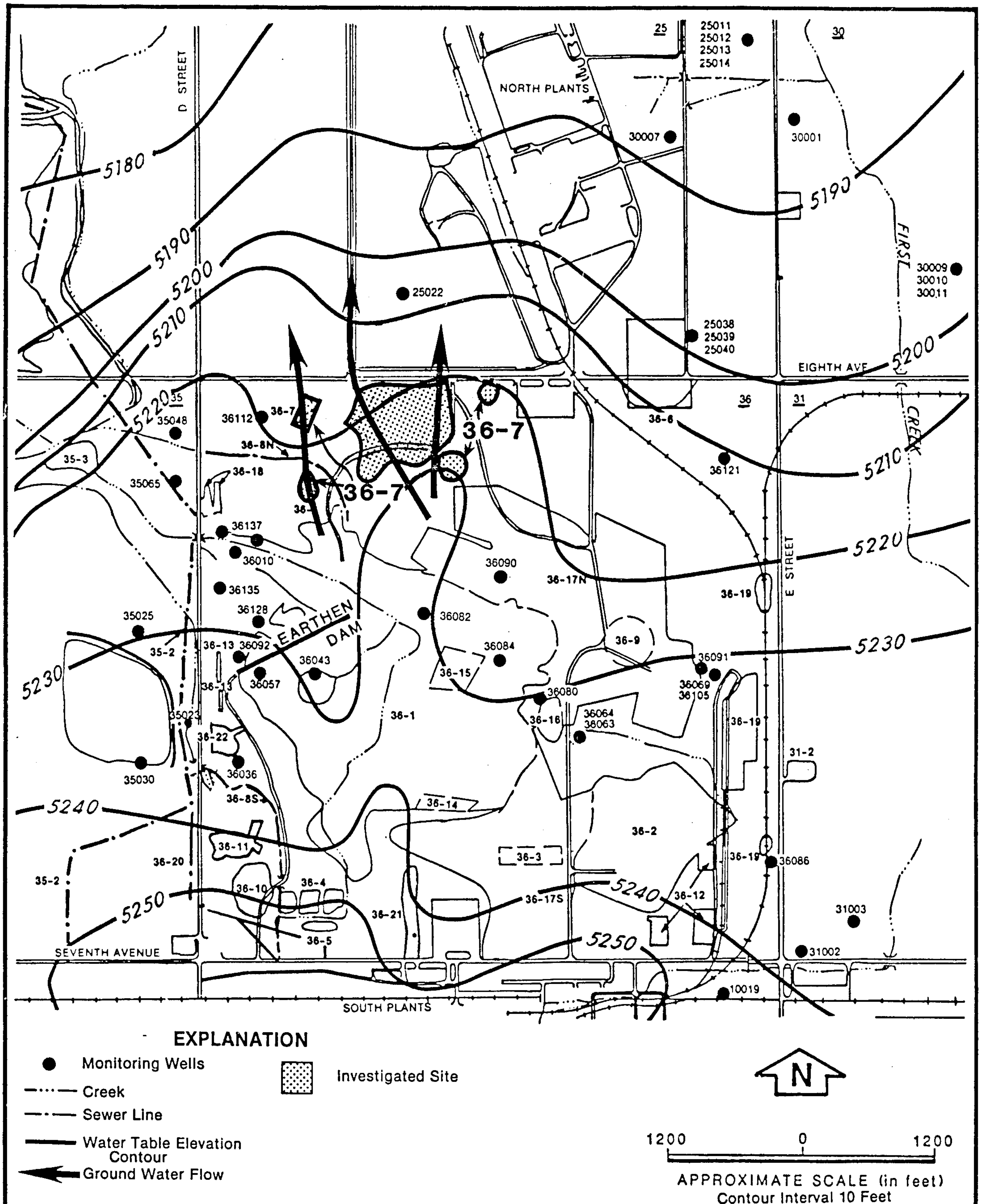

Figure 36-7-4
REGIONAL GROUND WATER FLOW
SITE 36-7
ROCKY MOUNTAIN ARSENAL
SOURCE: ESE, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

target analytes were not detected downgradient of Site 36-7 in Wells 25022 and 25024 (Denver Formation), but Denver Formation Well 25023 contained benzene and p-chlorophenylmethyl sulfide. Several target compounds were detected, however, upgradient of the site in Alluvial Well 36082. These target compounds included diisopropylmethyl phosphonate (DIMP), isodrin, 1,4-oxathiane, 1,4-dithiane, p-chlorophenylmethyl sulfide (CPMS), p-chlorophenylmethyl sulfoxide (CPMSO), p-chlorophenylmethyl sulfone ($CPMSO_2$), arsenic, m-xylene, chloroform, 1,2-dichloroethane, dichlorodiphenyl trichloroethane, and trichloroethane.

Compounds detected upgradient of the site represent a class of chemicals typically found in the ground water beneath much of Section 36. As a result, there is no indication that activities at this site contribute to ground water contamination. Data presented here are for background purposes and are not intended to be correlated with soil sample analytical results generated as part of the Phase I study.

2.0 HISTORY

The following narrative represents an updated partial revision of the site history and supersedes as indicated all previously transmitted historical narratives concerning this site. It has been prepared following a full review of information identified during the course of discovery in United States Versus Shell Oil Co., Civil Action No. 83-C-2379 (consolidated with No. 83-C-2386) (D. Colo.).

Site 36-7, Solid Waste Burial/Sanitary Pits, is situated in the northwestern quadrant of Section 36. The site encompasses a number of discrete areas where surface and subsurface disposal has occurred, as well as areas which have displayed evidence of surface disturbance. Disposal activities can be attributed to both Army and Shell operations.

Ground disturbances within the bounds of Site 36-7 can be traced back to 1943. An aerial photograph taken that year revealed a light-toned circular area with dark spots at the center, situated along the northern edge of Section 36 west of the midsection line [Chemical Warfare Service (CWS, 1945a]. This disturbance was investigated as an outlying area situated northeast of the central investigated site. The presence of the disturbance in aerial photographs from 1943 through 1982 [Colorado Aerial Photo Service (CAPS), 1948-1982, Negative 51] and its apparent correlation to a hilltop suggest that the disturbance is naturally occurring.

The second ground disturbance to become apparent at Site 36-7 was revealed in a 1950 aerial photograph. The figure of a bisected square had apparently been scraped on the ground surface. The figure was designated as Site 13 by William J. Moloney in his "Assessment of Historical Waste Disposal in Section 36 of RMA" and now corresponds to the central portion of Site 36-7 (Moloney, 1982, RIC#85085R01, pp. 7-5, 7-15: Moloney, 1985, pp. 171-172). The purpose behind the creation of the square figure is unknown.

By May 1951, numerous areas of grading scars had become apparent south of and along the length of Eighth Avenue in Section 36 (RMA, 1951). Two such scars were situated east of the square figure, within the bounds of Site 36-7. A third grading scar, located west of the square figure, was

identified by Moloney in a 1953 aerial photograph and designated Site 18 (Moloney, 1982, RIC#85085R01, pp. 7-7, 7-16). The analysis for this site was inadvertently omitted from the Assessment of Historical Waste Disposal of Section 36 Report (Moloney, RIC#85085R01, 1982); however, in 1985 Moloney recalled Site 18 as "a marginal site in the sense that it may have simply been nothing more than a source of fill material" (Moloney, 1985, p. 183). These grading scars may be related to the construction of the GB Facility north of Eighth Avenue (RMA, 1951).

By 1958, and potentially as early as 1956, a ground disturbance characteristically more indicative of disposal activities was situated north of the square figure, on a hillside along the north-central boundary of Site 36-7 (Moloney, 1982, RIC#85085R01, pp. 7-9, 7-17: Donnelly, 1985b, pp. 1254-1256). This trench-like disturbance presented no visible indications in 1962 of burning or of outlying ground scarring (CAPS, 1948-1962, Negative 114-135). The potential for disposal of contaminated material having occurred at this trench site essentially is supported solely by Kenneth D. Mitchell. Mitchell, a long-time employee of the Arsenal, states in a 1985 deposition his belief that contaminated equipment was burned and buried on the hillside portion of north-central Site 36-7 (Mitchell, 1985a, pp.35-39: Mitchell, 1985c). Conversely, two other long-time Arsenal employees, Murray C. Lynes and George F. Donnelly, refute the contention that contaminated materials could have been disposed at Site 36-7 (Lynes, 1985b, pp. 423-424: Donnelly, 1985b, pp. 1196-1198).

By 1962, surficially decontaminated Army plant equipment was, on occasion, removed from a production facility and placed on the ground surface in an area southwest of the Site 36-8 north drainage ditch bend for a period of months pending its transport to the Site 36-17 North burning pits (Rock, 1985a. pp. 244-248: Rock, 1985b: Banks, 1977: Knaus, 1985, pp. 320-321: CAPS, 1948-1962, Negative 114-135). This equipment dump was included in the Site 36-7 investigation as an outlying area southwest of the central portion of the site. A burning pit has been identified southeast of the contaminated equipment dump by numerous sources (Banks, 1977: USATHAMA and RMA, 1984: RMA, undated): however, the burning pit is not evident in available aerial photographs. The nature of the material that may have been

disposed at the suspected burn site is unknown. The suspected burning pit appears to be located outside the bounds of the outlying portion of Site 36-7 (USATHAMA and RMA, 1984).

In early 1964, a permanent burning pit with steel mats and supports was constructed at Site 36-7. The pit measured approximately 10 ft wide, 10 ft deep, and 100 ft long and was excavated for the sole purpose of burning uncontaminated trash, since the only other refuse burning pit was located miles away in the warehouse area of Section 4 (Donnelly, 1963; CAPS, 1948-1982, Negative 117-165). By 1965, this single uncontaminated trash-burning pit, which had by this time supplanted the warehouse area burning pit, was operating on a weekly basis and was receiving an estimated 24,000 pounds of refuse a day (Tisdale, 1965; Porter, 1966; CAPS, 1948-1982, Negative 120-124). Essentially the same materials were directed to the Site 36-7 trash pit as had been directed to the warehouse area pit, including wood scrap, paper, garbage, solid wastes from the medical dispensary, and empty paint and solvent cans (Donnelly, 1985a, pp. 779-780; Donnelly, 1986; Lynes, 1985a; Rock, 1985a, pp. 279-280). This burning pit was operated by the Maintenance Division, which also handled trash collection (Keller, 1965; Lynes, 1985a, p. 50).

In May 1966, a presidential directive was issued which compelled RMA to comply with local air pollution controls. Pursuant to this directive, open-pit burning of uncontaminated wastes at the Arsenal was phased out by both Shell and the Army in 1966 (SCC, 1968e, pp. I-1, II-1; Cleere, 1968; Knaus, 1986; Burke, 1966a; Turk, 1966; Speer, 1966; SCC, 1967a; Speer, 1967; Donnelly, 1970). The Army trash-burning pit at Site 36-7 was converted into a sanitary landfill area (Knaus, 1967a; Grubbs, 1975; RMA, 1967a; USATEC, 1973; Conner, 1985; Donnelly, 1985b; Lynes, 1985b, pp. 423-424; Plant, 1985a; Plant, 1985b; Rock, 1985a, pp. 276-278; Rock, 1985b). Shell was permitted to dispose at the Army sanitary landfill of waste paper products that it could certify were uncontaminated (Knaus, 1966; SCC, 1967a, SCC, 1968g; Eck, 1982a; Eck, 1982b; Eck, undated; Knaus, 1985, pp. 315-316; Lynes, 1985b, pp. 347-348). Although the Army continued to burn its contaminated waste in Site 36-17 North pits through 1969 (Porter, 1966; Tisdale, 1965; Rock, 1969), the Army advised Shell in September 1966

that it would no longer burn Shell's contaminated waste in the pits (SCC, 1967a). This Army decision forced Shell to accumulate its contaminated/ potentially contaminated trash at an unknown location on the Arsenal and to seek other means for its final disposition (SCC, 1967a; Knaus, 1986; Knaus, 1967b). Shell resolved this issue, at least for a few years, by installing a du Pont-type incinerator at Site 36-7.

Shell's du Pont incinerator is located in south-central Site 36-7, approximately 1,860 ft east of "D" Street and 560 feet south of 8th Avenue (SCC, 1967a; Grubbs, 1975). This incinerator is an above-ground, open-air facility designed by the E.I. du Pont de Nemours Company (Burke, 1966b; Butin, undated; Culley, 1967; SCC, 1968e, pp. II-2, IV-1). The facility could handle up to 10,000 pounds of trash in a 4-hour burning period (SCC, 1967c, p. 2).

The du Pont incinerator is an open-pit-type incinerator, in that the top of the facility remains open to enable radiation of the flame to the sky (SCC, 1967c, p.1). To protect against emission of solid particles, a mesh screen cover, approximately eight feet in height, is installed on the top surface of the incinerator (Donnelly, 1968; SCC, 1967c, p. 1; Monroe, 1966, pp. 229-230). The mesh screen not only rests on the incinerator but also has loading doors which were used for the purpose of dumping waste material inside the incinerator chamber for burning (SCC, 1977, pp. II-1, II-2; Swift, 1986). Approximately 15 ft long, 8 ft wide, and 10.5 ft deep, the interior of the incinerator is lined with fire brick (Butin, undated; Culley, 1967; SCC, 1968e, p. II-1). This lining is encased by steel walls for added support and protection (Butin, undated; Swift, 1986). Additionally the incinerator uses natural gas as the fuel and is equipped with air-injection equipment to ensure maximum combustion. A concrete access ramp leads to the loading doors, complementing the structure (Knaus, 1986, p. 1173; SCC, 1968e, pp. II-1, II-2; Butin, undated).

In September 1967, a 1.37-acre tract of land was leased in the northwest quadrant of Section 36 to Shell at its request for the construction and ultimate operation of the du Pont incinerator (Misterek, 1978; Grubbs, 1975; U.S COE, 1967; SCC, 1967b; Plummer, 1985). This area was specifically

chosen because of the availability of gas and electricity as well as its proximity to the Arsenal's burning pits and sanitary landfill (Burke, 1967). By November 1967, the facility had been installed and was apparently in use (RMA, 1967b; Walker, 1967; SCC 1968a).

In the late sixties, the du Pont incinerator largely replaced Shell's use of the sanitary landfill as a means for disposal of uncontaminated sanitary waste (SCC, 1968g; SCC, 1968a). In addition to sanitary waste, from approximately November 1967 to May 1969, the incinerator was used by Shell for the disposal of contaminated solid waste and chemical waste, including spent acid filter cartridges; scrap metal and drums contaminated with aldrin, dieldrin, Planavin, and endrin; allyl chloride filters (used); chlorophenylmethyl sulfone; aldrin and dieldrin in solid form and in filter cartridges; azodrin; bidrin; gardona; Supona; unknown flammable solvents; isopropyl alcohol; and substances contaminated with acetone, benzene, hexane, and methanol (SCC, 1968a; SCC, 1968b; SCC, 1968c; SCC, 1968d; SCC, 1968e; p. III-2; SCC, 1968f; SCC, 1968-1972, pp. 114, 116).

The du Pont incinerator was apparently not designed to burn chemical waste per se. On January 2, 1968, an explosion occurred in the interior chamber of the incinerator, damaging the firebrick lining, entry door, and overhead screen, which was also displaced. The explosion occurred when a drum containing approximately 35 gallons of hexane was loaded into the incinerator along with sanitary trash and burned. Following this incident, Shell gradually phased out the burning of chemical waste in the incinerator (SCC, 1968a; SCC, 1968b; SCC, 1968e, p. III-2).

Conducting miscellaneous decontamination operations in the South Plants area in the vicinity of Shell plants, the Army was also seeking a means for the disposal of potentially contaminated trash at the Arsenal in order to cease open-pit burning. In 1967, the Army was interested in constructing its own du Pont-type incinerator to help minimize air pollution (Shaw, 1967a; Shaw, 1967b); however, its plans were cancelled due to the high costs of the incinerator (Russell, 1967; Hartman, 1967; Donnelly, 1985c). At this point, the Army's George Donnelly, as he explained in his 1985 deposition, prevailed upon Shell to fund the installation of the incinerator. Shell's du

Pont incinerator was subsequently used by both Shell and the Army (Donnelly, 1985c). The Army burned/decontaminated empty drums, equipment, and lumber in the incinerator (Gerton, 1985; Dreier, 1985).

Shell dumped its potentially contaminated pallets and wood scrap items marked for destruction in the incinerator to an open ground surface area northwest of the incinerator and south of the landfill area dirt road. The Army also stored potentially contaminated wood scrap items at the dump (Augenstein, 1985; Knaus, 1985, pp. 317-319; USATEC, 1973; CAPS, 1948-1982, Negative 132-360).

In approximately March 1969, the Army negotiated a contract with Shell for the occasional use of the incinerator, in an effort to dispense with the open-pit burning (Gaon, 1969; Donnelly, 1969a; Donnelly, 1969b). The Army had been using the incinerator on a courtesy basis (Gaon, 1969; Walker, 1967), but the proposed contract was apparently never executed.

As a result of excess particulate emissions levels, Shell was prohibited in may 1969 from further burning of paper products and garbage (Venezia, 1969, pp. 1-2; Hartman et al., 1969, pp. 1, 5). Shell resumed segregation of its wastes and directed its uncontaminated material to the Army sanitary landfill (Hartman et al., 1969, p. 5; Venezia, 1969, p. 1). In 1969, the Army was using the du Pont incinerator to thermally decontaminate metal scrap and equipment as well as to dispose of contaminated waste (Hartman et al., 1969, p. 5; Donnelly, 1969a; Davies, 1969).

Throughout the seventies, Shell utilized the incinerator for the incineration of "clean-burning materials/trash." No smoke or fly ash producing materials (including cardboard, plastic waste, rubber, or chemical substances, other than residue) were burned in the incinerator. This was done in an effort to comply with air pollution control regulations (Knaus, 1979; Knaus, 1980a; SCC, 1977, p. V-2A: Justice, 1973: Doyle and Jorgenson, 1978). The incinerator was used to destroy damaged to slightly contaminated wooden pallets and to thermally decontaminate metallic substances, including steel drums, piping, fittings, and the like which were sold as scrap or recycled (SCC, 1968-1972, pp. 227, 264, 282; Knaus, 1978b; Knaus, 1979;

Justice, 1973; Doyle and Jorgenson, 1978; SCC, 1977, p. III-1). Prior to decontamination, drums were washed out in the South Plants area in order to minimize the feeding of contaminants to the incinerator and to assure decontamination (Knaus, 1979; Knaus, 1978b; Knaus, 1980a). According to 1977 Shell operating instructions, other metallic substances like piping and pail "may contain...small quantities of product" (SCC, 1977, p. V-2). The instructions reveal that, after each burn, ash was loaded into drums and that metallic substances were stored nearby the incinerator (SCC, 1977, pp. III-1, and V-2). Used brick from the incinerator was disposed of at the sanitary landfill west of Building 347 (Site 2-14a) (Eck, 1982b).

By 1970, the Army sanitary landfill area at Site 36-7, which included the du Pont incinerator, consisted of approximately nine trenches, apparently only one of which remained uncovered. This one trench, oriented northeast, was situated between the landfill area road and Eighth Avenue. The majority of the landfill trenches had been excavated south of the dirt road and the original trash-burning pit at the site (CAPS, 1948-1982, Negative 132-360). By March 1971, the last open trench at the landfill was covered, and in subsequent years a landfill in Section 30, Site 30-4, was used by the Army (Massey, and Swann, 1972; USATEC, 1973; Donnelly, 1985a, pp. 779-780; Rock, 1985a, pp. 281-282; CAPS, 1948-1982, Negative 134-356).

Between July 1, 1972 and June 30, 1973, a portion of the trash generated from the TX Anti-Crop Demilitarization Program was decontaminated with paraformaldehyde and either burned in the du Pont incinerator or disposed in the Site 30-4 landfill (USATEC, 1973; RMA, 1973; Donnelly, 1985a, pp. 779-780).

The size of both the incinerator area dump and the Army contaminated equipment dump had greatly increased by April 1974 (CAPS, 1948-1982, Negative 140-432). The du Pont incinerator evidently could not handle the volume of contaminated lumber being accumulated at the site, and by November 1974, the incinerator area dump was destroyed in an open-air burn (Augenstein, 1985; Knaus, 1985, pp. 317-319; CAPS, 1948-1982, Negative 141-53). In subsequent years, Shell continued to dump potentially contaminated wood in the vicinity of its incinerator (Knaus, 1985,

pp. 317-319). By 1976, the Army relocated the uncontaminated scrap lumber and metal dump west of Building 621, Section 4, to Site 36-7 (RMA, 1976: Mitchell, 1985a, pp. 57-60; Mitchell, 1985b; Mitchell, 1985c; Moloney, 1985, pp. 173-174).

A second ground surface dumping area for Army contaminated equipment situated northeast of the Site 36-8 North Drainage Ditch bend, came into use by 1975 (Banks, 1977; CAPS, 1948-1982, Negative 142-108). This dump was in the southwest portion of Site 36-7. The two Army contaminated equipment dumps grew dramatically in size during the late seventies (CAPS, 1948-1982, Negative 146-97, 125). However, between June and October 1980, a portion of the equipment dump southwest of the drainage ditch was apparently removed (CAPS, 1948-1982, Negatives 20, 83). Within a year only dark-toned spots remained at the two dump sites (CAPS, 1948-1982, Negatives 225,51). The rapid increase in the size of the contaminated equipment dumps through the seventies can be linked to the cessation in 1969 of the open-pit burning of contaminated material (Rock, 1969).

Shell continued to use the du Pont incinerator "clear up to the last day" of its tenancy on the Arsenal (Knaus, 1986, p. 1174). Various Shell estimates provide an indication as to the quantity of material burned/decontaminated in the incinerator. From April 15, 1979, to December 31, 1979, Shell operated the incinerator 30 times, processing 73,000 pounds of slightly contaminated wooden pallets and boxcar bracing and a total of 3,610 five-gallon, 30-gallon and 55-gallon (crushed and washed) metal containers for sale as scrap (Knaus, 1980a). During the early eighties, Shell continued to process wooden pallets, washed steel drums, and miscellaneous metal scrap in the incinerator (Adcock, 1980; Culley, 1980a; SCC, 1981b). From May 23, 1980, to November 5, 1980, Shell, in the course of 20 burning sessions, burned approximately 33 tons of wood and 34 tons of metal in the incinerator (Culley, 1981b). In 1981 Shell burned approximately 37 tons of wood and 47 tons of metal in the incinerator (Culley, 1981b). On December 7, 1981, Shell estimated that it would burn 50 tons of wood and 60 tons of metal (Schneider, 1981).

In December 1982, Shell terminated its lease with the Army and shut down its chemical plant facilities at the Arsenal (RMA, 1983; Andrews, 1982). As a result, Shell ceased operating and utilizing the incinerator (Knaus, 1986).

On December 20, 1982, as Shell prepared to cease operations at the Arsenal, an open-air burn of an estimated 250 tons of scrap lumber, contaminated pallets, boxcar bracing, telephone poles, and cardboard was conducted at Site 36-7. After the burn, the area was scraped clean, and the ashes were burned in a nearby pit (Knaus, 1982b; Massa, 1982; Knaus, 1985, pp. 317-319). The Army apparently contributed waste material to the burn (Knaus, 1982a).

In early 1983, the U.S. Army Armament Materiel Readiness Command planned a systematic "surface sweep" of Section 36 to locate, recover, and dispose of all exposed metal debris and surety material. The plan noted the existence of several old pits in the Site 36-7 area and warned of the potential requirement to cut up large metal items for subsequent thermal decontamination (Pittman, 1983; Smith, 1983). By the fall of 1983, the Army's Escort and Disposal Detachment completed the sweep. Chemical and hazardous explosive items, as well as a large quantity of scrap metal and functionally inert munitions, were removed from Section 36 disposal area during the sweep (RMA, 1982: Jacobs, 1985; Heim, 1985).

In the spring of 1984, another surface sweep of Section 36 was conducted by the Army. However, no additional exposed materials were found at the time (Smith, 1983: Jacobs, 1985).

On October 30, 1980, contaminated equipment and scrap from mustard operations, including a glass-lined reactor vessel approximately 8 ft long, 4 ft wide, and 3 ft deep, were located at an unidentified site of the Basin A area (Kim, 1980: Mc Neill, 1980: Ursillo, 1984, p. 2). These materials were transported to the Toxic Storage Yard pending ultimate disposition (Garcia, 1980). It was noted that the reactor contained an unknown amount of material identified by laboratory analyses as being mustard agent

(Ursillo, 1984, p.1). The reactor was decontaminated in June 1984 in Shell's du Pont incinerator (Ursillo, 1984, p. 2; Black, 1984; Garcia, 1984).

In this case, the incinerator was not used for the purpose of firing/burning. In an effort to dissolve the mustard, the reactor was treated, within the walls of the incinerator, with a decontaminating solution. The incinerator's purpose was to serve as a pit for the containment of liquid in the event of an emergency. The decontamination process consisted of administering 10 gallons of methyl cellosolve and approximately 400 gallons of a decontaminating solution (one pound "HTH" per one gallon water). The solution was poured into the reactor to overflowing proportions. In addition, the decontamination operator, by means of spraying "HTH" over the reactor, thoroughly decontaminated its exterior (Ursillo, 1984: Garcia, 1984; Rogers, 1984: RMA, 1984).

Following decontamination, the cleanup phase was completed by pumping the spent decontaminating solution from the reactor into 55-gallon drums, which were to be taken to Building 1703, washing the reactor with water, and subsequently air drying the reactor. The decontaminated reactor was scheduled to be taken to Building 1606 (Ursillo, 1984, pp.2-6; Garcia, 1984; Rogers, 1984: RMA, 1984).

In 1985, the Army decontaminated the du Pont incinerator (McGrath, 1985).

Available aerial photographs (CWS, 1945a: CWS, 1945b; CAPS, 1948-1982: RMA, 1953: Moloney, 1982, pp. 7-15, 7-17) of Site 36-7 are summarized as follows:

Photograph Date	Site Description
July 9, 1943	The sole disturbance within the bounds of Site 36-7 appears as a light-toned circular area with dark spots at the center, situated along the northern edge of the Section 36 west of the midsection line.
August 20, 1945	The site appears unchanged.
October 21, 1948	The site appears unchanged.

1950	The figure of a bisected square has apparently been scraped on the ground surface. The ground surface within the square is undisturbed.
March 25, 1951	The site appears unchanged.
May 2, 1951	Numerous grading scars appear east and west of the square figure.
1953	The square figure and surrounding ground scars remain apparent.
1958	A trench-like disturbance is apparent north of the area of the square figure. The square figure is no longer visible. Three dark spots, possibly ponds ~~pods~~ or trenches, are visible near Eighth Avenue.
August 11, 1962	The trench-like disturbance presents no indications of burning or of being heavily trafficked. A ground surface dump appears to be in use southwest of the Site 36-8 North drainage ditch bend.
May 5, 1963	Roads now lead to the trench-like disturbance from Eighth Avenue and from the Site 36-17 North burning pits, lending an appearance of heavy use.
March 3, 1964	A well-defined trench is apparent southeast of the trench-like disturbance. The new trench is dark-toned, indicating burning, and is linked to Eighth Avenue by an improved road.
April 29, 1965	Numerous dirt roads cross the areas between the trench-like disturbance, the trench-burn site, and the ground surface dump.
April 25, 1970	The site appears radically different. The du Pont incinerator is present southeast of the trench burn site. A dump is situated ~~just situated~~ just northwest of the incinerator. West of the dump and south of a dirt road are numerous covered trenches, including the trench burn site first apparent in 1964. North of the dirt road, a northeast-oriented, apparently open trench is situated in a large graded area among more covered trenches. Additional material is evident at the dump site southwest of Site 36-8 North.

March 30, 1971	Approximately nine trenches were excavated at the site and all now appear to be covered. Both dump sites have increased in size.
October 26, 1972	The incinerator area dump and the drainage ditch area dump have become larger.
October 5, 1973	The dump sites continue to grow.
April 28, 1974	The incinerator area dump measures approximately 380 feet from east to west and 280 feet north to south. The drainage ditch area dump measures approximately 100 feet in diameter.
November 7, 1974	The site of the incinerator area dump now appears charred and graded.
October 15, 1975	A new dump site is apparent northeast of the Site 36-8 North drainage ditch bend and is larger than the present dump in the area. The former site of the incinerator area dump is clear and graded.
October 8, 1976	Both drainage ditch area dump sites have increased in size.
October 12, 1977	The dump sites continue to grow.
October 15, 1978	The dump sites continue to grow.
October 26, 1979	The dump sites continue to grow.
June 4, 1980	The dump sites continue to grow.
October 19, 1980	A portion of the material at the southwestern drainage ditch area dump site appears to have been removed.
October 19, 1981	Only dark spots are apparent at the two dump sites.
August 16, 1982	The site appears unchanged.

Surface and subsurface disposal activities transpired at Site 36-7 from the late fifties through the early eighties. Surface disposal activities included contaminated equipment dumps, contaminated lumber dumps, an uncontaminated scrap wood and metal dump, open-air burns, and operation of

the du Pont incinerator. Subsurface disposal activities principally consisted of sanitary landfill operations. Nevertheless, the occurrence of subsurface disposal in north-central Site 36-7 prior to the initiation of landfill operations is probable.

3.0 SITE INVESTIGATION

3.1 PREVIOUS SOIL INVESTIGATIONS

Site 36-7 soil is classified in the Ascalon-Vona-Truckton Association by the U.S. Soil Conservation Service (Sampson and Baber, 1974). The soil is predominantly Ascalon-Vona sandy loam that has a 1- to 5-percent slope. The Ascalon series consists of well-drained soil formed on level to moderately sloping uplands. The near-surface material is noncalcareous, brown, sandy loam which grades into a highly calcareous, brown, sandy loam. Ascalon soil absorbs water at a moderate to rapid rate and has a high available water capacity. In the central portion of the site, the soil is characterized as gravelly land-shale outcrop complex. This complex consists of shallow clayey soil overlain by a thin, discontinuous layer of gravel. The gravelly land-shale outcrop complex absorbs water at a slow rate and has a moderate to low available water capacity.

Two soil borings, yielding three samples, were drilled within Site 36-7 and analyzed under the Office of the Surgeon General (OTSG) program (Cogley, 1976, RIC#81266R09). Aldrin, chlordane, cadmium, endrin, and mustard were not detected at concentrations greater than 0.01 part per million (ppm) in the three samples. The following compounds were detected at concentrations above 0.01 ppm:

Compound	Range of Concentrations (ppm)
Arsenic	0.22 - 0.28
Copper	8.2 - 25
Dieldrin	0.03 - 0.05
Mercury	0.13 - 0.19
Zinc	28 - 68

Due to the limited sampling performed by the OTSG study, specific disposal trenches or pits may not have been sampled. The reported compounds and concentrations are thus unlikely to be representative of the entire site area.

3.2 PHASE I SURVEY

3.2.1 Phase I Program

The Phase I investigation of Site 36-7 consisted of drilling 21 boreholes ranging in depth from 5 to 25 ft. Borehole locations and site boundaries are shown in Figure 36-7-5. Although four borings (3118, 3119, 3120, and

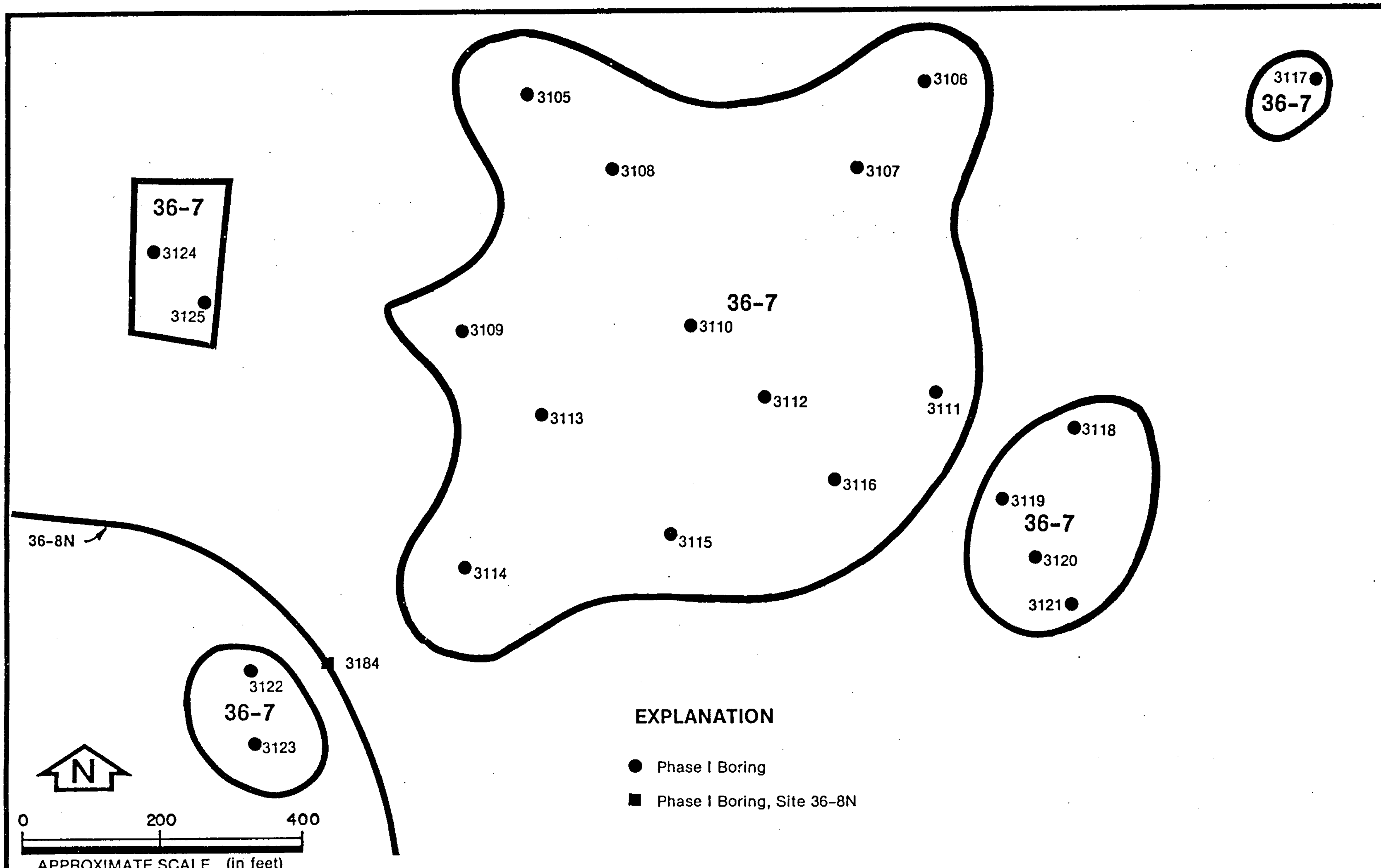

Figure 36-7-5
PHASE I INVESTIGATION BORING LOCATION MAP
SITE 36-7

SOURCE: ESE, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

3121) were originally planned to investigate the incinerator, these borings were incorrectly located in the field. Additional borings will be drilled in the Phase II program to investigate the incinerator.

Prior to drilling, all boring sites were cleared for safety purposes in accordance with the geophysical program detailed in the Task 1 Technical Plan (ESE, 1985, RIC#85127R07). Borehole site clearance was used to ensure drilling would not encounter buried unexploded ordnance (UXO) or other metal that could pose a significant safety risk. Magnetic intensity readings were obtained with a gradiometer. A 20-ft square grid was centered at each boring location, and gradiometer readings were obtained at a spacing of 5 ft through the area. A contour map was prepared from the data and used to place the boring in the safest location within the geophysical plot. Following borehole site clearance, a metal detector was used to check for surficial (0 to 2 ft) metal which may have presented a safety risk.

Results of the geophysical program necessitated relocation of two borings (3114 and 3120) due to the shallow metal debris indicated by metal detector scans. Gradiometer readings for these borings did not indicate any anomalies indicative of buried metal. The vertical-magnetic gradiometer contour plots for Boreholes 3113 and 3108 displayed anomalies indicative of buried metal; these borings were not relocated, however, due to the distance between the anomaly and the borehole.

A photoionization detector (PID), calibrated to an isobutylene standard, was used to obtain readings from the open boreholes during drilling and from soil samples during geologic logging. The PID measures the concentrations of organic vapors in the air and is a method of ensuring personnel safety.

The sampling program at Site 36-7 included the collection of 65 samples. Samples were obtained using the continuous soil sampling method described in the Task 1 Technical Plan (ESE, 1985, RIC#85127R07). Samples were obtained at predetermined intervals unless field conditions (i.e., water table, staining, etc.) required an adjustment in the intervals. If the soil column exhibited visual anomalies, extra samples were taken between the predetermined intervals.

Twenty-one borings yielding 65 samples were completed in Site 36-7 as follows:

Boring Number	Depth (ft)		Number of Samples
3105	10		3
3106	5		2
3107	10		3
3108	5		2
3109	5		2
3110	23.5		6
3111	5		2
3112	9		3
3113	7		3
3114	10		3
3115	5		2
3116	10		3
3117	10		3
3118	10		3
3119	5		2
3120	25		6
3121	5		2
3122	15		4
3123	10		3
3124	24		5
3125	10		3
		TOTAL	65

All samples were analyzed by gas chromatography/mass spectrometry (GC/MS) for semivolatile organic compounds and by inductively-coupled argon plasma (ICP) analyses for cadmium, chromium, copper, lead, and zinc. Separate analyses were conducted for mercury and arsenic using atomic absorption (AA) spectroscopy and for dibromochloropropane (DBCP) using GC. GC/MS volatile organic analyses were performed on six samples. A complete list of Phase I analytes is given in Appendix 36-7-A.

The Phase I remedial investigation program for this site was developed and implemented based on historical documentation, aerial photographs, and other information available at the time of its implementation. Since that time, previously unavailable information has been identified and incorporated into the history section of this report. This additional information has been evaluated in detail to determine how it might impact the investigation approach at this site. Based upon this evaluation, it has been determined that the additional information collected since the Phase I program was designed does not substantially alter the view of potential contamination at

this site. As a result, the Phase I program as conducted and Phase II program as planned are judged to provide a complete and accurate investigation of the possible contamination at this site.

3.2.2 Phase I Field Observations

Site 36-7 is littered throughout with miscellaneous debris, including metal fragments, wood, burn residue, and broken glass. Other features noted during the Phase I survey include the following:

- The Shell Chemical Company incinerator is south of the main access road. The incinerator is connected with the access road by a paved road. A concrete ramp is attached to the incinerator, and a small corrugated metal building is south of the incinerator.
- The 14-inch aboveground steamline is visible along Eighth Avenue north of the site.
- The area between Borings 3109 and 3113 is noticeably charred and has likely been used for incineration.
- A large ground scar is visible in the northeast of the site near Boring 3105.
- A wood pile is west of Boring 3113.
- Several soil mounds are located throughout the site. A ramp-like mound and possible fill area are near 3115.
- A 13-ft-high metal fuel tank is northeast of the incinerator near Boring 3118 and was used to fire the nearby deactivation furnace.
- The area in the immediate vicinity of Borehole 3113 was disturbed due to historic grading. Trench debris was encountered in this borehole at 2 to 3 ft. Drilling was halted at 7 ft due to a large impenetrable object and the sampling bit becoming plugged with wood fragments, burlap, and broken glass. The PID reading was 200 in the auger annulus at this interval. Subsamples from the 4- to 5-ft and 6- to 7-ft intervals were obtained for laboratory analysis.
- A partially subsided trench which appears to have been reinforced with railroad ties and metal sheeting is also near Boring 3113.

Air monitoring PID readings ranged from 0.8 to over 200 at Site 36-7. The highest reading (200) was obtained in Borehole 3113 (6 to 7 ft) and Borehole 3107 (9 to 10 ft). Except in these two instances, downhole PID readings varied from 0.8 to 2.8.

An M8 alarm and an M18A2 test kit were used to detect the presence of chemical agents in boreholes and soil samples. The M8 alarm is used specifically to detect GB and VX at detection levels of 0.2 and 0.4 milligrams per cubic meter (mg/m^3), respectively, after a response time of 2 to 3 minutes (USAMDARC, 1982; USAMDARC, 1979; HDOA, 1976). Many other substances, however, including smoke and engine exhaust can activate the M8 alarm. The M18A2 is used as a backup test if the M8 alarm is triggered, as a substitute for the M8, and as a specific check for the presence of mustard (H). Specifically at RMA, the M18A2 test kit is used to detect GB, VX, H, distilled mustard (HD), and L, based upon the knowledge that these agents were manufactured, stored, or demilitarized at the site. The detection limit for mustard agents is 0.5 mg/m^3; the detection limit for GB, VX, and L is 0.2 mg/m^3. The detection limits in soil for L and VX are 5 parts per million (ppm) and 5.9 ppm, respectively.

Samples at this site were tested for chemical agents by the Rocky Mountain Arsenal Laboratory. A composite of aliquots from each sample was initially analyzed for GB and H. Had positive readings been found, individual samples from each boring would have been analyzed to identify location. No positive results for chemical agent testing were found at this site.

3.2.3 Geophysical Exploration

The geophysical methods employed for Site 36-7 were chosen after extensive testing of numerous techniques in other Task 1 sites (HLA, 1986, RIC#86314P02). The two methods used in Site 36-7 included continuous magnetic surveying with a Geonics G-866, which measures minute changes in the earth's magnetic field, and continuous electromagnetic (EM) surveying with a Geonics EM-31D, which measures both in-phase and out-of-phase EM response.

Geophysics is an indirect technique that measures the electrical/physical properties of an object or lithology. Geophysical anomalies may be related to buried metal or to lithologic variations and/or depth to bedrock. The volcaniclastic unit of the Denver Formation, which subcrops beneath the site, has probably caused geophysical anomalies in other portions of RMA (Site 30-1, ESE, 1987b, RIC#87024R08) and may influence the geophysical data for this site. The correct interpretation of geophysical data is dependent upon experience and extensive site knowledge to identify anomalies induced by debris or contaminant plumes.

Within the limitations inherent in the methods, the geophysical data obtained in this investigation can be used to infer the presence of metal or chemical contamination. The magnetic technique is sensitive to the presence of ferrous metal, whereas in-phase EM can be used to detect both ferrous and nonferrous metal. Out-of-phase EM provides information regarding bulk soil conductivity and the possible presence of chemical contamination.

The geophysical survey consisted of alternating magnetic and EM lines spaced 25 feet apart. Continuous geophysical readings were taken along each traverse and stored on computer tape. Three individual contour maps were generated from the magnetic, EM in-phase, and EM out-of-phase data. Areas of anomalous geophysical response were noted for each map and used to produce a geophysical results summary map (Figure 36-7-6).

Anomaly A covers an area of approximately 150,000 ft^2 and is oriented northeast-southwest. This anomaly is characterized by strong magnetic EM in-phase and soil conductivity measurements. A 4-inch steel gas pipeline cuts through the middle of Anomaly A and continues toward Site 36-18 on the western boundary of Section 36. Visible ground scars parallel the trend of Anomaly A and correlate with the 12 trenches and 8 to 10 pits identified by Moloney (1982, RIC#85085R01). Gradiometer data indicate a complex distribution of trenches and suggest that Anomaly A may extend beyond the north and west survey area boundaries. The northern portion of this anomaly is characterized by the strongest soil conductivity values found at Site 36-7. A large ground scar was mapped in the vicinity of these high values.

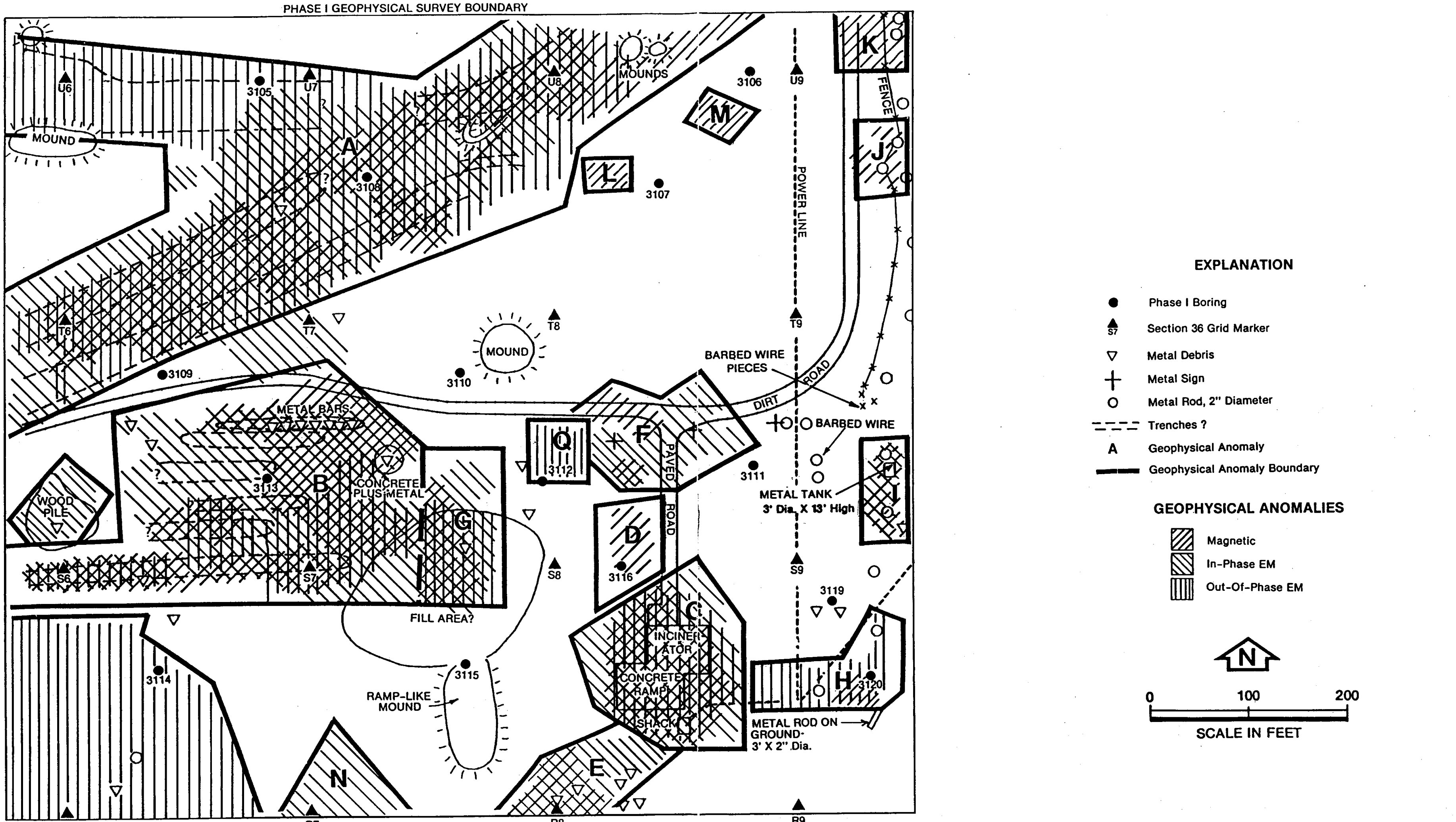

Figure 36-7-6
PHASE I INVESTIGATION GEOPHYSICAL RESULTS SUMMARY
SITE 36-7

SOURCE: HLA, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

The northern portion of Anomaly A also corresponds to the three dark spots identified in the 1958 aerial photograph. The dark spots are thought to be indicative of pools or trenches. The lack of magnetic anomalies in this section indicates nonferrous metal may be buried there, whereas potential trenches containing ferrous metal debris may exist in the remainder of the anomaly. Borings 3105 and 3108 were drilled within the anomaly boundaries, and Boring 3109 was drilled on the southern edge of the anomaly.

Anomaly B confirms historical aerial photographs which show disposal trenches in an east-west trending layout. Moloney's interpretation (1982, RIC#85085R01) of this area matches the apparent trench distribution identified by the geophysical anomalies. Ground scars indicate that the trenches are approximately 10 to 30 ft wide with a 5- to 20-ft space between them. Tracing individual trenches was difficult over the 120,000 ft^2 anomaly, as the positioning of the trenches approaches the lateral resolution of the gradiometer. The greatest magnetic values for the anomaly were recorded in the northern trenches and were probably derived from the protruding metal rods in the northern-most trench. EM in-phase data did reveal a strong gradient indicative of accumulations of buried metal and concrete at the location of a possible pit. Anomaly G, which appears to be an extension of Anomaly B, is composed of north-south oriented magnetic, EM in-phase, and soil conductivity data.

Soil conductivity values were also well above background at Anomaly B. Values recorded at this anomaly were second only to those recorded at Anomaly A. An area of strong EM in-phase readings within this anomaly was investigated by Boring 3113. EM in-phase data indicate a northwest-trending anomaly in the northwest corner of Anomaly B which may be caused by surficial and buried nonferrous metal. The northwest-trending direction is a different orientation from the rest of the anomaly.

A wood pile near Anomaly B produced strong EM in-phase and soil conductivity readings. These readings suggest buried nonferrous metal, although such readings may be caused by the wood pile and the small amount of surface metal.

Two significant combined (magnetic, EM in-phase, and soil conductivity) anomalies (C and D) covering 26,000 ft^2 were produced by the Shell Chemical Company incinerator. The incinerator is built out of firebrick and steel walls with a metal mesh screen cover. A concrete ramp, probably steel reinforced, is attached to it. A corrugated metal building is just south of the incinerator. No evidence of disposal trenches, either in historical aerial photographs or in the field, were found in these anomalies. Anomaly D was investigated by Boring 3116.

Anomaly E covers approximately 6,000 ft^2 on the southern edge of the geophysical survey boundary. Six pieces of surface metal are within the anomaly; however, the strong magnetic and EM in-phase data also suggest the presence of buried metal. A minor soil conductivity anomaly that also correlated with these data appears to extend south beyond the survey boundary. No Phase I borings were drilled within this anomaly.

Anomaly F is at the junction of the main dirt access road and the paved road leading to the incinerator. The anomaly covers approximately 11,000 ft^2 and includes strong magnetic and EM in-phase values with strong soil conductivity values in the western portion. The anomaly is next to the dirt road which is consistent with the historical practice of excavating next to a road for easy disposal handling. The combined geophysical data indicate buried material is probably present. No Phase I borings were drilled within this anomaly, although Boring 3111 was drilled less than 100 ft to the southeast of this anomaly.

Anomaly N is on the southern geophysical boundary west of Anomaly G and covers an area of approximately 5,600 ft^2. Although no magnetic or soil conductivity anomalies occur at this location, no surficial structures in the vicinity are capable of creating this false EM in-phase anomaly.

Although Anomaly N may be influenced by lithological variations on the volcaniclastic unit, the source of the anomaly is assumed to be buried, nonferrous metal. No Phase I borings were drilled in this anomaly.

Anomaly Q is a low conductivity zone just west of Anomaly F. Faint ground scarring can be seen in most aerial photographs of this area. The area was described as a "mound of material" by Moloney (Moloney, 1982, RIC#85085R01) in reference to the 1970 aerial photograph. Anomaly Q, which covers an area of approximately 3,000 ft^2, may be due to buried nonmetallic debris. Boring 3112 was drilled along the southern boundary of the anomaly.

Intense soil conductivity values were recorded in the southwestern corner of the site. These values are attributed to shallow bedrock underlying the area or a shallow water table, since similar anomalies have been recorded at RMA where these conditions prevail. This anomaly was investigated by Boring 3114 and is approximately 45,000 ft^2.

The remaining anomalies at Site 36-7 appear to be the result of surficial metal scraps or metal structures and are not indicative of contamination.

3.2.4 Phase I Analyte Levels and Distribution

Site 36-7 resulted from a wide variety of disposal practices. Anticipated contaminants at the site included chemical agents, metals, and pesticides. Degradation products and manufacturing by-products as well as chemical agents and UXO were expected at this site.

Table 36-7-1 contains indicator ranges and a statistical summary of Phase I analytical results. A summary of analytical data for each sample, including lithology and air monitoring results is presented in Table 36-7-2. A listing of the target compounds and a tabulation of analytical data can be found in Appendices 36-7-A and 36-7-B.

To assess the significance of metal and organic analytical values, indicator ranges were established. For organic compounds, the indicator level is the method detection limit. For metals, the indicator range reflects the upper end of the normal range for each metal as naturally found in RMA alluvial soil. Selection of these ranges is discussed in the Introduction to the Contamination Assessment Reports (ESE, 1986a). Concentrations within or above indicator levels for Phase I data are presented in Figure 36-7-7.

Table 36-7-1. Summary of Analytical Results for Site 36-7

			Concentrations (μg/g)					
	Number of Samples*	Range	Mean	Median	Standard Deviation	ESE Detection Limit	MRI Detection Limit	Indicator Range
Volatiles (N=6)								
None Detected								
Semivolatiles (N=64)								
Aldrin	1	7	--	--	--	0.9	0.5	DL
Dieldrin	3	0.8-8	--	--	--	0.3	0.6	DL
DIMP	2	3-4	--	--	--	0.5	3.0	DL
Metals (N=65)								
Cadmium	14	0.60-5.1	1.6	1.0	1.2	0.90	0.50	DL-2.0
Chromium	63	7.4-30	14	13	4.7	7.2	7.4	25-40
Copper	65	5.0-81	18	14	14	4.8	4.9	20-35
Lead	27	18-33	23	22	4.7	17	16	25-40
Zinc	61	28-98	49	42	18	16	28	60-80
Arsenic (N=65)	20	4.8-17	6.7	5.8	2.7	4.7	5.2	DL-10
Mercury (N=65)	6	0.050-0.35	0.13	0.07	0.11	0.050	0.070	DL-0.10

* Number of samples in which constituent was detected above the detection limits.
† N = Number of samples analyzed.
-- Not calculated for less than five detections.

Source: ESE, 1987

Table 36-7-2. Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples (Page 1 of 5)

Bore Number Depth (ft) Geologic Material	3105 0-1 Sandy Silt	3105 4-5 Sandy Silt	3105 9-10 Sandy Silt	3106 0-1 Sandy Silt	3106 4-5 Silty Sand	3107 0-1 Sandy Silt	3107 4-5 Sandy Silt	3107 9-10 Sandy Silt	3108 0-1 Sandy Silt	3108 4-5 Sandy Silt	3109 0-1 Sandy Silt	3109 4-5 Sandy Silt	3110 0-1 Sandy Silt
AIR MONITORING													
PID*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	>200	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY													
Volatiles (µg/g)													
Not Analyzed													
Semivolatiles (µg/g)													
None Detected													
DBCP (µg/g)													
None Detected													
Metals (µg/g)													
Cadmium	BDL	3.3	BDL	2.1	BDL	BDL	BDL	BDL	1.1	1.8	BDL	0.90	BDL
Chromium	13	10	9.0	10	13	10	10	22	9.0	15	14	22	11
Copper	13	16	14	8.0	10	8.0	6.0	12	8.0	8.0	30	29	16
Lead	22	23	BDL	27	18	BDL	BDL	18	BDL	20	BDL	BDL	BDL
Zinc	49	58	64	33	39	28	28	49	31	39	49	64	34
Arsenic (µg/g)	5.4	5.0	BDL	BDL	4.8	BDL	BDL	5.5	BDL	5.3	BDL	BDL	BDL
Mercury (µg/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Table 36-7-2. Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples (Continued, Page 2 of 5)

Bore Number Depth (ft) Geologic Material	3110 4-5 Sandy Silt	3110 9-10 Sandy Silt	3110 14-15 Claystone (Denver Formation)	3110 19-20 Claystone (Denver Formation)	3110 22.5-23.5 Claystone (Denver Formation)	3111 0-1 Sandy Silt	3111 4-5 Silty Sand	3112 0-1 Sandy Silt	3112 4-5 Sandy Silt Some Gravel	3112 8-9 Sandy Silt With	3113 0-1 Sandy Silt	3113 4-5 Sandy Silt	3113 6-7 Sandy Silt
AIR MONITORING													
PID*	BKD	BKD	BKD	BKD	2	BKD	BKD	BKD	BKD	2	BKD	BKD	>200
SOIL CHEMISTRY													
Volatiles (µg/g)													
Not Analyzed	NA	NA	NA	BDL	NA	NA	NA	NA	NA	BDL	NA	NA	NA
Semivolatiles (µg/g)													
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.8	8
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7
DBCP (µg/g)													
None Detected													
Metals (µg/g)													
Cadmium	BDL	BDL	BDL	BDL	BDL	5.1	BDL	BDL	BDL	BDL	BDL	BDL	1.8
Chromium	12	14	13	17	14	16	16	14	20	13	14	18	19
Copper	12	15	43	48	46	9.0	7.0	7.0	11	10	14	17	18
Lead	BDL	BDL	BDL	BDL	BDL	18	BDL	19	23	20	BDL	BDL	27
Zinc	39	38	82	91	82	39	42	40	54	44	40	45	67
Arsenic (µg/g)	BDL	BDL	BDL	BDL	BDL	7.1	5.8	5.9	6.6	6.9	BDL	BDL	BDL
Mercury (µg/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Table 36-7-2. Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples (Continued, Page 3 of 5)

Bore Number Depth (ft) Geologic Material	3114 0-1 Slightly Sandy Silt	3114 4-5 Sandy Silt Some Gravel	3114 9-10 Weathered Claystone (Denver Formation)	3115 0-1 Slightly Sandy Silt	3115 4-5 Sandy Silt	3116 0-1 Sandy Silt	3116 4-5 Silty Clay	3116 9-10 Sandy Silt	3117 0-1 Silty Sand	3117 4-5 Claystone (Denver Formation)	3117 9-10 Claystone (Denver Formation)	3118 0-1 Sandy Silt	3118 4-5 Sandy Silt
AIR MONITORING													
PID*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY													
Volatiles (µg/g)													
Not Analyzed	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	BDL	NA	NA
Semivolatiles (µg/g)													
Dieldrin	BDL	BDL	BDL	1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
DBCP (µg/g)													
None Detected													
Metals (µg/g)													
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	0.80	BDL	0.6	1.1	1.0	BDL	BDL
Chromium	BDL	10	17	14	12	16	23	13	14	21	24	10	15
Copper	14	11	16	15	12	14	22	12	16	47	51	13	15
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	26	27	31	BDL	BDL
Zinc	32	BDL	49	91	35	42	58	BDL	37	89	87	BDL	35
Arsenic (µg/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (µg/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Table 36-7-2. Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples (Continued, Page 4 of 5)

Bore Number Depth (ft) Geologic Material	3118 9-10 Sandy Silt	3119 0-1 Sandy Silt	3119 4-5 Sandy Silt	3120 0-1 Silty Sand	3120 4-5 Silty Sand	3120 9-10 Silty Sand	3120 14-15 Silty Sand	3120 19-20 Weathered Claystone (Denver Formation)	3120 24-25 Claystone (Denver Formation)	3121 0-1 Silty Sand	3121 4-5 Silty Sand	3122 0-1 Silty Sand	3122 4-5 Silty Sand
AIR MONITORING													
PID*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	0.8	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY													
Volatiles (µg/g)													
Not Analyzed	NA	NA	NA	NA	NA	NA	NA	NA	BDL	NA	NA	NA	NA
Semivolatiles (µg/g)													
None Detected	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
DBCP (µg/g)													
None Detected													
Metals (µg/g)													
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.70
Chromium	19	13	16	9.0	8.0	12	13	16	10	9.0	9.0	11	21
Copper	18	15	17	6.0	5.0	11	9.0	12	28	6.0	7.0	12	26
Lead	BDL	BDL	BDL	20	BDL	18	19	21	32	BDL	BDL	BDL	20
Zinc	53	32	36	38	29	48	42	48	74	33	38	BDL	51
Arsenic (µg/g)	BDL	BDL	BDL	BDL	BDL	5.5	5.6	5.4	6.0	BDL	BDL	BDL	BDL
Mercury (µg/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.080	BDL	BDL	BDL	BDL

Table 36-7-2. Concentrations of Target Analytes Above Detection Limits in Site 36-7 Soil Samples (Continued, Page 5 of 5)

Bore Number Depth (ft) Geologic Material	3122 9-10 Silty Sand	3122 14-15 Clayey Sand	3123 0-1 Silty Sand	3123 4-5 Silty Sand	3123 9-10 Silty Sand	3124 0-1 Silty Sand	3124 4-5 Sandy Silt	3124 9-10 Cemented Gravel	3124 14-15 Weathered Claystone (Denver Formation)	3124 19-20 Claystone (Denver Formation)	3125 0-1 Sandy Silt	3125 4-5 Silty Sand	3125 9-10 Sandy Silt
AIR MONITORING													
PID*	BKD	BKD	1.2	2.8	2.0	BKD	BKD	BKD	BKD	1.2	BKD	BKD	BKD
SOIL CHEMISTRY													
Volatiles (µg/g)													
Not Analyzed	NA	BDL	NA	NA	NA	NA	NA	NA	NA	BDL	NA	NA	NA
Semivolatiles (µg/g)													
DIMP	3	4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NA	BDL	BDL	BDL
DBCP (µg/g)													
None Detected													
Metals (µg/g)													
Cadmium	BDL	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	24	30	13	16	17	9	9.0	10	11	8.0	8.0	15	7.4
Copper	24	29	14	19	17	9.0	7.0	10	49	81	7.0	11	10
Lead	BDL	25	19	BDL	BDL	25	BDL	BDL	31	33	23	19	BDL
Zinc	63	68	32	43	40	49	34	36	98	47	32	48	34
Arsenic (µg/g)	BDL	BDL	BDL	BDL	BDL	5.8	BDL	7.5	10	17	BDL	6.6	5.5
Mercury (µg/g)	BDL	0.35	BDL	BDL	BDL	BDL	BDL	BDL	0.070	0.16	0.070	BDL	0.050

* As calibrated to an isobutylene standard.
BKD No readings above ambient background.
BDL Below detection limit.
NA Not Analyzed

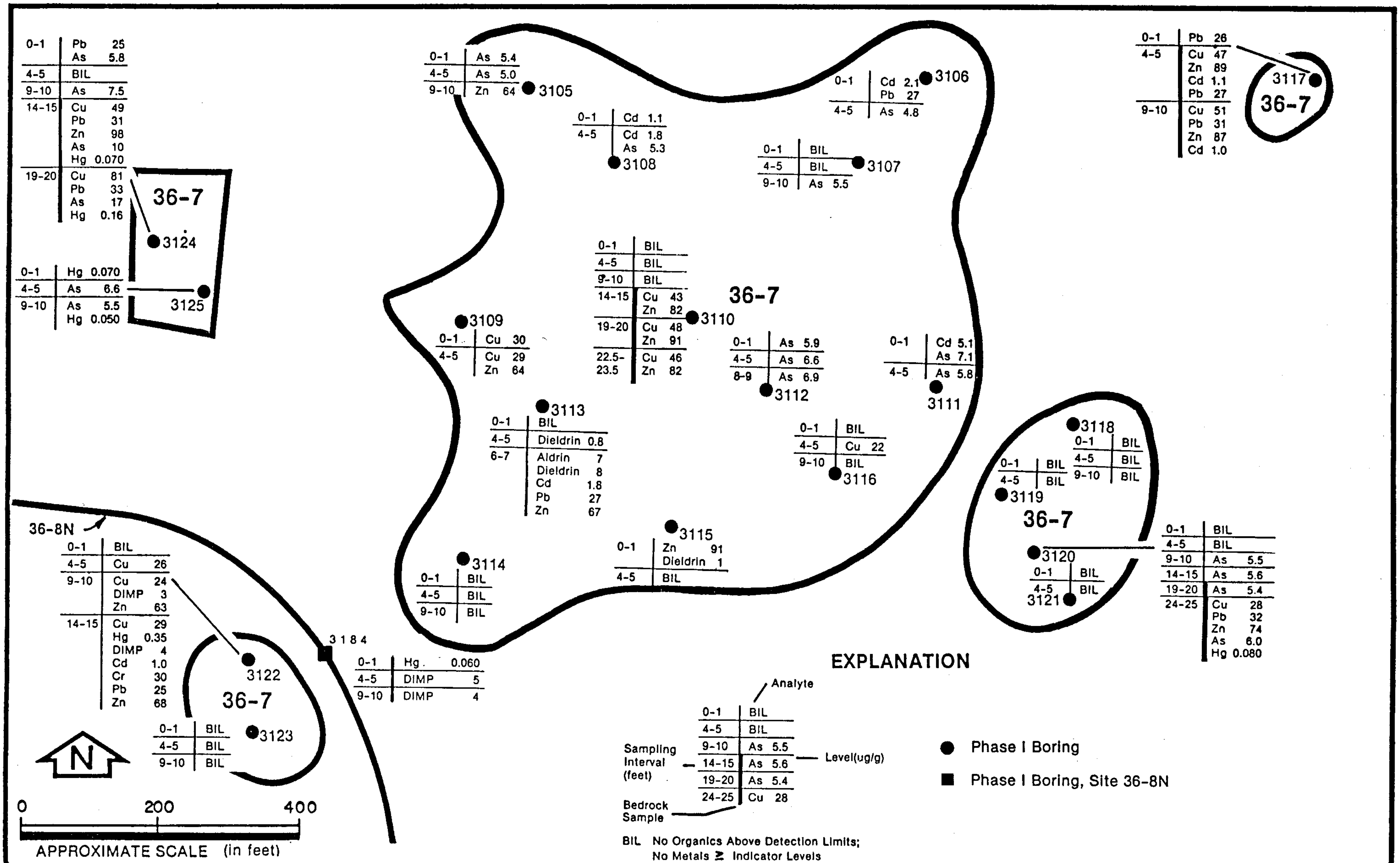

Figure 36-7-7
PHASE I INVESTIGATION CHEMICAL ANALYSIS RESULTS
SITE 36-7
SOURCE: ESE, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

The organochlorine pesticides dieldrin and aldrin were detected in two borings from the central portion of Site 36-7. Dieldrin was detected in Boring 3113 in the 4- to 5-ft and 6- to 7-ft samples at levels of 0.8 and 8 ppm, respectively. A concentration of 1 ppm of dieldrin was detected in the 0- to 1-ft sample from Boring 3115. Aldrin was detected in the 6- to 7-ft sample of Boring 3113 at 7 ppm. Boring 3113 is within Anomaly B, whereas Boring 3115 is south of Anomaly B near a mound of possible fill material. Boring 3122 contained DIMP at 3 and 4 ppm in the 9- to 10-ft and 14- to 15-ft sample, respectively. This boring is in the southwestern outlying area of Site 36-7, just south of Site 36-8.

Arsenic concentrations within the indicator range were detected sporadically throughout the site with the exception of Boring 3124 (19 to 20 ft) which contained arsenic at 17 ppm. This sample, however, was taken from bedrock which typically contains higher concentrations of base metals than the alluvium.

Mercury was also detected within the site, but less frequently than arsenic. Concentrations exceeding the indicator range were found in the 19- to 20-ft sample (0.16 ppm) from Boring 3124 and in the 14- to 15-ft sample (0.35 ppm) in Boring 3122.

ICP metals were found throughout the site, and concentrations were generally within the indicator range for alluvial material with the exception of cadmium. Elevated cadmium concentrations were detected in borings from the central portion of Site 36-7. Boring 3106 (0 to 1 ft) contained cadmium slightly above the indicator range, and Boring 3111 contained cadmium at 5.1 ppm in the 0 to 1 ft interval. One zinc concentration in Boring 3115 (0 to 1 ft) also exceeded the indicator range; however, the borehole is near the incinerator. Remaining concentrations of ICP metals exceeding the indicator range were in samples taken from bedrock, which typically contains higher levels of base metals, especially zinc and copper.

Several compounds were detected by GC/MS that were not included in the target compound list and that were not conclusively identified. These compounds are included in the data presented in Appendix 36-7-B.
Table 36-7-3 lists the boring number, sample interval depth, relative

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Page 1 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3105	0-1	523	1	510100	BAX	oxabicycloheptane	g
		527	0.9	510100	BAX	cyclohexenol	e
		533	1	510100	BAX	cyclohexenone	e
		609	0.5	510100	BAX	dihydroxypropylhexadecanoate	f,d,h
		618	1	510100	BAX	octadecenoic acid	d,h
3105	4-5	618	0.2	510101	BAX	octadecenoic acid	f,d,h
		619	0.3	510101	BAX	butyl-p-toluene sulphonate	e
3105	9-10	603	2	510102	BAX	octadecenol	d
		604	2	510102	BAX	hexadecene	e
		609	2	510102	BAX	bis (methylpropyl) phthalate	c,h
		624	1	510102	BAX	octadecenyloxyethanol	g
3106	0-1	604	2	510106	BAX	hexadecanol	d
		609	1	510106	BAX	bis (methoxyethyl) phthalate	c
		618	0.9	510106	BAX	octadecadienol	d
		624	0.8	510106	BAX	octadecenyloxyethanol	f
3106	4-5	513	0.2	510107	BAX	toluene	e
		515	0.3	510107	BAX	hexanone	e
		516	0.4	510107	BAX	hexanol	e
		523	0.5	510107	BAX	oxabicycloheptane	f
		530	0.2	510107	BAX	unknown	a
3107	0-1			510112	BAX		j
3107	4-5	513	0.3	510113	BAX	toluene	e
		515	0.3	510113	BAX	hexanone	e
		516	0.2	510113	BAX	hexanol	e
		619	0.3	510113	BAX	butyl-p-toluene sulphonate	e
3107	9-10			510114	BAX		j
3108	0-1	515	1	510118	BAX	hexanone	e
		516	1	510118	BAX	hexanol	e
		618	0.8	510118	BAX	octadecadienyloxyethanol	f
		619	0.5	510118	BAX	butyl-p-toluene sulphonate	e
		624	0.5	510118	BAX	octadecenol	d,f,h
3108	4-5	516	0.4	510119	BAX	hexanol	e
		611	0.5	510119	BAX	1,3-benzenediol, monobenzoate	d
		619	0.3	510119	BAX	butyl-p-toluene sulphonate	e

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued, Page 2 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3109	0-1			510124			i
3109	4-5			510125			i
3110	0-1			510130			i
3110	4-5			510131			i
3110	9-10			510132			i
3110	14-15			510133			i
3110	19-20			510134	MEF		i
3110	22.5-23.5			510172	MEF		i
3111	0-1	515	0.3	510136	BAX	hexanone	e
		516	0.2	510136	BAX	hexanol	e
		619	0.3	510136	BAX	butyl-p-toluene sulphonate	e
		635	0.2	510136	BAX	unknown hydrocarbon	a,f,h
3111	4-5			510136	BAX		i
3112	0-1	619	0.3	510142	BAX	butyl-p-toluene sulphonate	e
		635	0.3	510142	BAX	unknown hydrocarbon	a,f,h
3112	4-5			510143			i
3112	8-9	573	0.3	510144	BAX	toluene	e
		581	0.3	510144	BAX	unknown	a
		619	0.3	510144	BAX	butyl-p-toluene sulphonate	e
3113	0-1	579	0.3	510148	MEF	diisobutyl butenedioate	d,f,h
		632	0.4	510148	MEF	C_{20} alkene	a,f
3113	4-5	628	0.4	510149	MEF	dioctyl adipate	d,f,h
		632	0.8	510149	MEF	alkene, C_{18} or higher	a,f
3113	6-7	598	0.7	510173	MEF	tetradecanoic acid	d,f,h
		618	0.6			octadecanoic acid	d,f,h
		632	1			alkene C_{18} or higher	a,f

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued, Page 3 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3114	0-1			510154	MEF	.	j
3114	4-5	579	0.4	510155	MEF	diisobutyl butenedioate	d,f,h
		632	0.6	510155	MEF	alkene, C_{18} or higher	a,f
3114	9-10	632	1	510156	MEF	alkene, C_{18} or higher	a
3115	0-1	577	8	510160	MEF	trichloroaniline	g
		579	6	510160	MEF	chlorinated unknown	a
		594	1	510160	MEF	C_{17} alkane	a
		605	1	510160	MEF	alkane	a
3115	4-5	633	0.7	510161	MEG	unknown	a,f
3116	0-1	579	0.8	510166	MEG	diisobutyl butenedioate	d,f,h
		608	0.4	510166	MEG	hexadecanoic acid	d,f,h
		632	3	510166	MEG	unknown	a
				510166	MEG		
3116	4-5	609	0.6	510167	MEG	diisobutyl phthalate	c,f
		629	0.7	510167	MEG	di-n-octyladipate	d
		632	1	510167	MEG	unknown	a
				510167	MEG		
3116	9-10	614	0.7	510168	MEG	dibutylnonanoate	d,f,h
		632	2	510168	MEG	eicosene	h
3117	0-1	579	0.6	510200	MEI	dissobutyl butenodioate	d,f,h
		614	1	510200	MEI	dibutyl nonanoate	d,h
		633	1	510200	MEI	alkene hydrocarbon	a

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued, Page 4 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3117	4-5	579	0.8	510201	MEI	diisobutyl butenedioate	d,f,h
		614	10	510201	MEI	dibutyl nonanoate	d,h
		632	1	510201	MEI	alkene hydrocarbon	a
3117	9-10	593	0.8	510202	MEI	unknown	a
		608	0.6	510202	MEI	hexodecanoic acid	d,f,h
		614	1	510202	MEI	dibutylnonanoate	d,h
		632	1	510202	MEI	alkene hydrocarbon	a
3118	0-1	579	0.4	510206	MEG	diisobutyl butenedioate	d,f,h
		608	0.4	510206	MEG	hexadecanoic acid	d,f,h
		614	0.4	510206	MEG	dibutylnonanoate	d,f,h
		633	2	510206	MEG	unknown	a
3118	4-5	579	0.3	510207	MEG	diisobutyl butenedioate	d,f,h
		625	3	510207	MEG	butoxyethylbutyl phthalate	c
		632	0.7	510207	MEG	pentatriacontene	g,h
3118	9-10	633	0.6	510208	MEG	eicosene	g,h
3119	0-1	579	0.6	510212	MEG	diisobutyl butenedioate	d,f,h
		608	0.6	510212	MEG	hexadecanoic acid	d,f,h
		633	3	510212	MEG	octadene or eicosene	g,h
3119	4-5	517	0.6	510213	MEG	toluene	e
		579	0.8	510213	MEG	diisobutyl butenedioate	d,f,h
		633	2	510213	MEG	pentatriacontene or eicosene	g,h

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued Page 5 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3120	0-1	618	0.2	510218	BAY	unknown	a
		619	0.2	510218	BAY	butyl-p-toluene sulphonate	e
3120	4-5	618	0.6	510219	BAY	octadecenoic acid	d,f,h
		619	0.3	510219	BAY	butyl-p-toluene sulphonate	e
3120	9-10	619	0.3	510220	BAY	butyl-p-toluene sulphonate	e
		631	1	510220	BAY	dioctylhexanedioate	d,h
3120	14-15	618	0.6	510221	BAY	octadecenoic acid	d,f,h
		619	0.3	510221	BAY	butyl-p-toluene sulphonate	e
3120	19-20	618	0.8	510222	BAY	octadecenoic acid	d,f,h
		619	0.4	510222	BAY	butyl-p-toluene sulphonate	e
3120	24-25	618	0.9	510223	BAY	octadecenoic acid	d,f,h
		619	0.4	510223	BAY	butyl-p-toluene sulphonate	e
3121	0-1	523	0.5	510224	BAZ	oxabicycloheptane	e
		527	0.2	510224	BAZ	cyclohenenol	e
		533	0.3	510224	BAZ	cyclohexenone	e
		618	0.2	510224	BAZ	octadecenoic acid	d,f,h
3121	4-5	523	0.3	510225	BAZ	oxabicycloheptane	e
		533	0.2	510225	BAZ	cyclohexenone	e
		634	0.2	510225	BAZ	phthalate	c,f,h
		638	0.3	510225	BAZ	phthalate	c,f,h
3122	0-1	517	0.5	510230	MEH	toluene	e
		633	0.4	510230	MEH	unknown hydrocarbon	a,f

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued, Page 6 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3122	4-5	579	0.5	510231	MEH	diisobutyl butenedioate	d,f,h
		614	0.4	510231	MEH	dibutyl nonanoate	d,f,h
		632	1	510231	MEH	unknown	
3122	9-10	517	0.6	510232	MEH	toluene	e
		632	0.7	510232	MEH	alkene hydrocarbon	a
3122	14-15	564	0.8	510233	MEH	unknown	a
		579	0.8	510233	MEH	diisobutyl butenedioate	d,f,h
		632	2	510233	MEH	alkene hydrocarbon C_{16}-C_{30}	a
3123	0-1	517	0.4	510236	MEH	toluene	e
		579	0.5	510236	MEH	diisobutyl butenedioate	d,f,h
		633	1	510236	MEH	alkene hydrocarbon	a
3123	4-5	517	0.4	510237	MEH	toluene	e
		579	0.5	510237	MEH	diisobutyl butenedioate	d,f,h
3123	9-10	517	0.8	510238	MEH	toluene	e
		579	1	510238	MEH	diisobutyl butenedioate	d,h
		614	2	510238	MEH	dibutylnonenoate	d,h
		632	1	510238	MEH	alkene hydrocarbon	a
3124	0-1	523	0.5	510242	BAZ	oxabicycloheptane	e
		603	1	510242	BAZ	octadecenol	
		604	2	510242	BAZ	octadecanol	
		609	2	510242	BAZ	hexadecanoic acid	
		624	0.8	510242	BAZ	octadecenol	
3124	4-5	523	0.4	510243	BAZ	oxabicycloheptane	e
		533	0.3	510243	BAZ	cyclohexenone	e
		609	0.2	510243	BAZ	hexadecanoic acid	d,f,h
		630	0.6	510243	BAZ	dioctylhexanedioate	d,f,h

Table 36-7-3. Tentative Identification of Nontarget Compounds in Site 36-7 Soil Samples. (Continued, Page 7 of 7)

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best Fit	Comments
3124	9-10	523	0.4	510244	BAZ	oxabicycloheptane	f
		604	0.6	510244		octadecanol	d,f,h
		609	0.7	510244		hexadecanoic acid	d,f,h
		618	3	510244		octadecenoic acid	d,h
3124	14-15	523	0.7	510245	BAZ	oxabicycloheptane	f
		604	0.4	510245	BAZ	octadecanol	d,f,h
		609	0.4	510245	BAZ	hexadecanoic acid	d,f,h
		630	0.3	510245	BAZ	dioctylhexanedioate	
3124	19-20			510246	BAZ		j
3125	0-1	604	0.5	510248	BAZ	octadecanol	d,f,h
		618	0.5	510248	BAZ	octadecenoic acid	d,f,h
		638	0.2	510248	BAZ	phthalate	c
3125	4-5	534	0.3	510249	BAZ	unknown	a
		604	0.4	510249	BAZ	octadecanol	d,f,h
		631	8	510249	BAZ	dioctylhexanedioate	d,h
3125	9-10	581	0.5	510250	BAZ	unknown	a
		609	0.9	510250	BAZ	unknown	a
		618	2	510250	BAZ	octadecenoic acid	d,h
		624	0.5	510250	BAZ	unknown	a

* Values reported are blank corrected.

a. No positive identification.
b. Surfactant.
c. Plasticizer (note: All phthalates and adipates will have this comment).
d. Derived from natural products.
e. Suspected laboratory contaminant.
f. Low concentration.
g. Low frequency of occurrence.
h. Ubiquitous.
i. Possible column bleed.
j. None detected.

Source: ESE, 1987.

retention time (shown as "unknown number" on the table), concentration, sample number, lot, best-fit identification, and comments for these nontarget compounds detected at Site 36-7. It should be noted that an individual compound may have more than one retention time, and also that a particular retention time may be assigned to more than one compound. Table 36-7-3, therefore, provides only a general indication of additional compounds that may be present.

Of the 64 samples analyzed, 59 samples contained nontarget compounds. Most of these compounds were tentatively identified as naturally-occurring compounds, laboratory related contaminants, phthalates or could not be positively identified. Boring 3115 (0 to 1 ft) contained trichloroaniline and a chlorinated unknown. Both of these compounds are possibly related to the dieldrin (1 ppm) in the sample.

Hexane, cyclohexane, hexadecene, and oxabicycloheptane were identified in several samples from two lots, and cyclohexanone and oxabicycloheptane were detected in the method blanks for these lots. Since these compounds are structurally related, these four nontarget compounds are considered to be laboratory-related contaminants. Toluene and butyl-p-tolune sulphonate were identified in several samples and the accompanying method blank at low concentrations. Both of these compounds are also considered to be the result of laboratory contamination.

3.2.5 Phase I Contamination Assessment

Although ICP metals were detected throughout the site, concentrations were mostly consistent with indicator ranges established for alluvial material at RMA. Boring 3111 (0 to 1 ft) contained cadmium above the indicator range at 5.1 ppm. Further investigation of this elevated cadmium concentration is warranted. Higher concentrations of base metals were found in bedrock samples, but were consistent with values typically found in the Denver Formation.

Twenty-seven samples contained possible laboratory contaminants. One sample (Boring 3115, 0 to 1 ft) contained two nontarget compounds possibly related to dieldrin contamination. The remainder of the nontarget compounds were naturally occurring.

DIMP was detected in the 9- to 10-ft and 14- to 15-ft intervals of Boring 3122, which was drilled in the southwest outlying area of Site 36-7. Boring 3184 (Site 36-8), which was drilled in the nearby chemical drainage ditch, exhibited similar DIMP concentrations (ESE, 1987a, RIC#87113R01). As a result, this portion of Site 36-7 will be included in the Site 36-8 Phase II Program. Since the samples containing DIMP from Boring 3122 were collected near the water table, contaminated ground water may contribute to DIMP contamination in this area.

Several geophysical anomalies mapped throughout the site are indicative of potential trench and disposal sites. Although Anomaly A contains several suspected trenches, no Phase I borings were drilled within the trenches. Borings 3105 and 3108 were within the anomaly, but target compounds were not detected above the indicator ranges. Further investigation of the suspected trenches and Anomaly A are warranted.

Anomaly B contained a trench with protruding metal bars, as well as several other potential trenches as mapped by the field team. Boring 3113 was drilled at the edge of one of the suspected trenches, however, a large impenetrable object was encountered at 7 ft. Subsurface samples (4 to 5 ft and 6 to 7 ft) from this boring revealed concentrations of dieldrin and aldrin. Further investigation of these potential trench sites is recommended.

Although not in a geophysical anomaly, Boring 3115 (0 to 1 ft) contained zinc and dieldrin at concentrations that exceeded the indicator ranges. This boring is on a mound of material, possibly fill, and is southeast of Anomaly B. Aerial photographs show this boring to be within a trench, although the trench was not confirmed by the geophysical survey. Further investigation of this material is recommended to identify the source of dieldrin and zinc in this area.

Anomalies C and D were attributed to the incinerator. Although Boring 3166 was within Anomaly D, no target compounds were detected at concentrations above the indicator ranges. Borings 3118, 3119, 3120, and 3121 were drilled too far east to investigate the area around the incinerator, thus, additional Phase II borings are recommended.

Anomalies E and N are along the southern boundary of Site 36-7. Strong geophysical values within each anomaly indicate potential disposal sites. As no Phase I borings were placed within the anomalies, additional Phase II borings are recommended.

Geophysical data from Anomaly F also indicate potential buried material. Boring 3112 was at the southern edge of this anomaly; however, concentrations of target analytes were within or below the indicator ranges from this boring. Further investigation of Anomaly F is recommended. A strong soil conductivity anomaly was recorded in the southwest corner of Site 36-7. Moloney (1982, RIC#85085R01) identified a trench in this location which may be the source of the anomaly. Although Boring 3114 was within the anomaly, concentrations of target analytes were below the indicator ranges. Further investigation of this anomaly is recommended due to the strong conductivity values.

3.3 PHASE II SURVEY

On the basis of the Phase I investigation and a review of aerial photographs, the boundaries of Site 36-7 have been revised. The four outlying areas will not be investigated in the Site 36-7 Phase II program. The southwestern outlying area will be investigated under the Site 36-8 Phase II Investigation, which will evaluate lateral contamination from the ditch. The other three outlying areas have been omitted since analytes indicative of contamination were not detected in the Phase I investigation. Boundaries of the central portion of the site have also been modified (Figure 36-7-8).

The Phase II program will consist of a total of 30 borings. Three of these borings will be drilled to 10 ft and sampled at intervals of 0 to 1, 4 to 5, and 9 to 10 ft. Two of the borings will investigate Anomaly F, one on

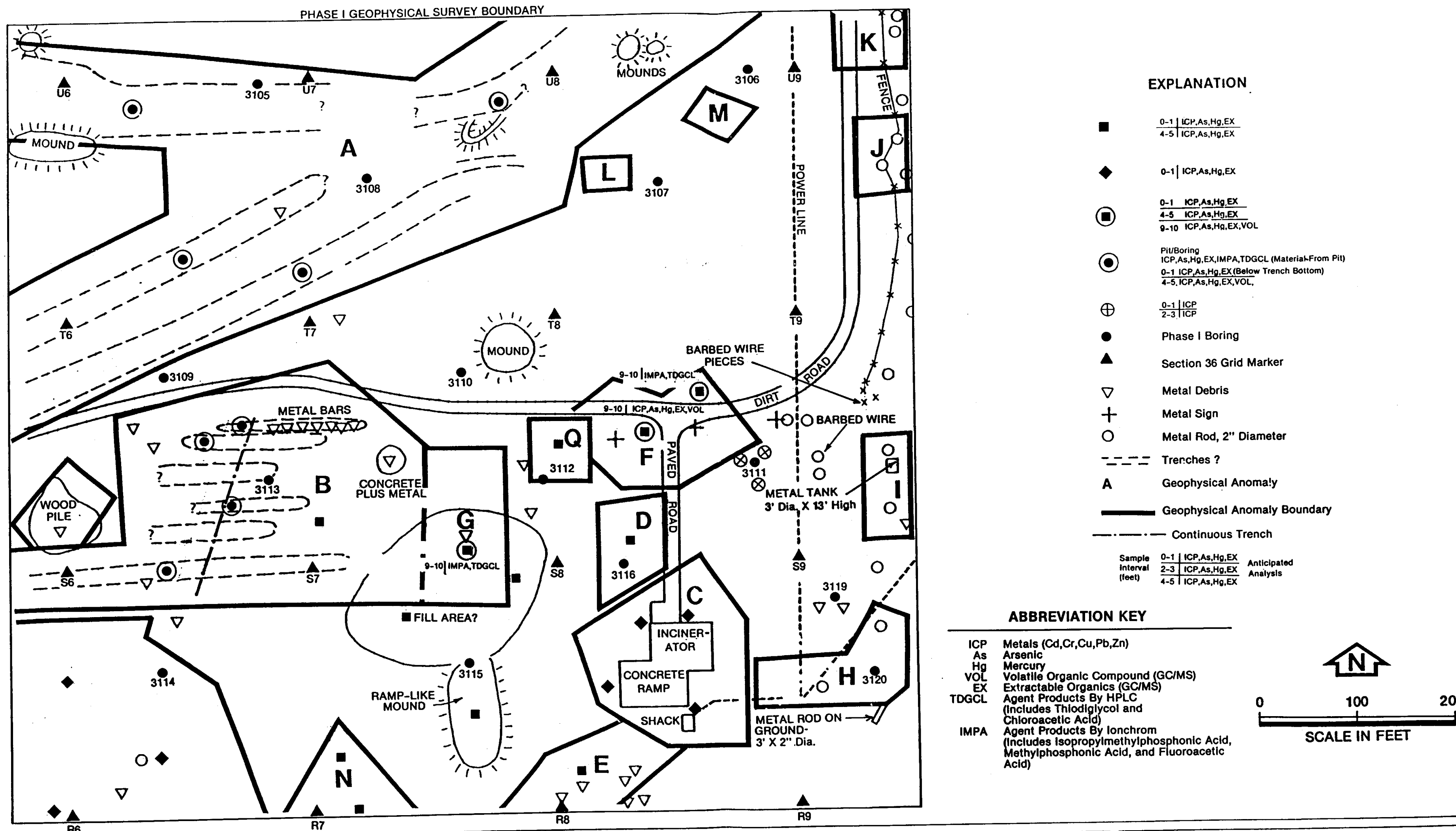

Figure 36-7-8
PROPOSED PHASE II INVESTIGATION BORING LOCATION MAP
AND CHEMICAL ANALYSIS SCHEDULE
SITE 36-7
SOURCE: ESE, 1987

Prepared for:
U.S. Army Program Manager's Office
For Rocky Mountain Arsenal
Aberdeen Proving Ground, Maryland

either side of the access roads and the remaining 10-ft boring will investigate the suspected north-south trending anomaly (Anomaly G) on the eastern edge of Anomaly B. Nine Phase II borings will be drilled to 5 ft. Two of these borings will be drilled within Anomaly N to investigate the high EM in-phase values. One boring will be placed in each of the four anomalies, B, D, E, and Q. Three borings will be placed in the mounded material near Boring 3115. All 5-ft borings will be sampled at 0- to 1-ft and 4- to 5-ft intervals.

Seven 0- to 1-ft samples will be collected utilizing hand-augering techniques. Three of these samples will be collected in the area of high soil conductivity in the southwestern corner of the site. The four remaining samples will be collected around the incinerator within Anomaly C, since Phase I data were not collected in this area.

Three borings will be drilled to 3 ft and sampled at 0- to 1-ft, and 2- to 3-ft intervals. These borings will be triangulated around Boring 3111 which contained cadmium at 5.1 ppm.

Pit borings will be dug using a backhoe in each of eight suspected trenches in Anomalies A and B in order to catalog material and define the vertical extent of contamination. Each of the eight pits will be excavated to the trench bottom, as determined by visual evidence. One sample will be taken of the excavated material, which will later be replaced in the pits. The borings in the pits will be drilled to 5 ft, and will be sampled from 0- to 1-ft and 4- to 5-ft intervals as measured from the pit bottom.

A continuous trench will be dug across the suspected trenches in Anomaly B using a ditching machine to penetrate to the top of visual contamination. This trench will define the location and orientation of trenches and allow the four pit/borings to be targeted more accurately. No samples will be collected from the trench.

The total number of samples to be collected in the 30 Phase II boreholes are as follows:

Number of Borings	Depth (ft)	Number of Samples
3	3	6
3	10	9
9	5	18
7	1	7
0	Samples of material from pits	8
8	Samples from below pit bottom	16
Total 30		64

The analytical schedule for the Phase II program at Site 36-7 is summarized below:

Analytical Method	Number of Samples
Extractable Organic Compounds (GC/MS)	58
Volatile Organic Compounds (GC/MS)	11
ICP Metals	64
Arsenic	58
Mercury	58
TDGCL (includes thiodigycol and chloroacetic acid)	10
IMPA (includes isopropylmethyl phosphonic acid, fluoroacetic acid, methylphosphonic acid)	10

The Phase II samples will be subjected to ICP analyses for metals; mercury and arsenic will be analyzed by AA spectroscopy; and extractable and volatile organic compounds will be analyzed by GC/MS. Analysis for Army Agent Degradation Products (ADP) will be conducted on selected samples in accordance with protocol established by PMO-RMA as shown in Figure 36-7-8.

The original draft final version of this report and the proposed Phase II program were released on April 29, 1986. Comments on the original draft final report were received from Shell Chemical Company (SCC) and the Colorado Department of Health (CDH) and are included in Appendix 36-7-C. Responses to these comments were provided in a Memorandum of Agreement (MOA) meeting on June 4, 1986. Because of substantial revisions to the original report, a subsequent draft final report (version 2.3) was submitted to MOA for comment on December 28, 1987.

Comments on the revised draft final version of this report were received from SCC on January 16, 1988. These comments were considered in the preparation of this final report and are presented with responses in Appendix 36-7-C. U.S. Environmental Protection Agency (EPA) comments are an integral part of the review process and have been previously incorporated into this report. Comments were not received from the CDH on the revised draft final report prior to the distribution of this report.

3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL

The Decontamination Assessment Report (RMACCPMT, 1984, RIC#84034R01) outlined a hypothetical cleanup strategy for Site 36-7. This plan called for the removal of 229,000 bank cubic yards (bcy) from the 617,000-ft^2 site. The maximum depth of excavation was estimated at 10 ft.

The quantity of potentially contaminated soil was revised to 115,000 bank cubic yards (bcy), on the basis of Phase I sampling results and the geophysical program. Most of the potentially contaminated areas were encompassed by the geophysical anomalies. Phase I chemical data indicate that the areas between suspected disposal locations are predominantly uncontaminated; therefore, the revised estimate consists of the geophysical anomalies, the mounded material surrounding Boring 3115, and a 50-ft radius around Boring 3111.

The revised volume estimate of potentially contaminated soil at 36-7 is calculated as follows:

Description	Area (ft^2)	Depth (ft)	Volume (bcy)
Anomaly A	150,000	10	56,000
Anomaly B	120,000	10	44,000
Anomalies C and D	26,000	1	960
Anomaly E	6,000	5	1,100
Anomaly F	1,000	10	4,100
Anomaly N	5,600	5	1,000
Anomaly Q	3,000	5	560
Soil conductivity anomaly	45,000	1	1,700
Mounded material around Boring 3115	20,000	5	3,700
50 ft radius around Boring 3111	7,900	5	1,500
Totals	395,000		115,000

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APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

PHASE I ANALYTES AND CERTIFIED METHODS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
VOLATILE ORGANIC COMPOUNDS/GCMS	VOL	VO
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane (TCA)	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C_6H_6
Bicycloheptadiene	Bicycloheptadiene (BCHD)	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL_4
Chlorobenzene	Chlorobenzene	CLC_6H_5
Chloroform	Chloroform	$CHCL_3$
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC_6H_5
m-Xylene	meta-Xylene	13DMB
Methylene chloride	Methylene chloride	CH_2CL_2
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o,p-Xylene	ortho- and/or para-Xylene	XYLEN
Tetrachloroethene (PCE)	Tetrachloroethylene	TCLEE
Toluene	Toluene	MEC_6H_5
Trans 1,2-dichloroethene	Trans 1,2-dichloroethylene	12DCE
Trichloroethene (TCE)	Trichloroethylene	TRCLE
SEMIVOLATILE ORGANIC COMPOUNDS/GCMS	EXTRACTABLE ORGANIC COMPOUNDS (EX)	SVO
1,4-Oxathiane	1,4-Oxathiane	OXAT
2,2-Bis (para-chlorophenyl)-1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-Bis (para-chlorophenyl) 1,1,1-trichloroethane	Dichlorodiphenyltrichloroethane	PPDDT
Aldrin	Aldrin	ALDRN
Atrazine	Atrazine	ATZ
Chlordane	Chlordane	CLDAN
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	$CPMSO_2$
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dieldrin	Dieldrin	DLDRN
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP

APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
SEMIVOLATILE ORGANIC COMPOUNDS (CONT)		
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP
Dithiane	Dithiane	DITH
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene (HCPD)	CL_6CP
Isodrin	Isodrin	ISODR
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1(2,4-dichlorophenyl) vinyldiethyl phosphate	SUPONA
Vapona	Vapona	DDVP
METALS/ICP	ICAP	ICP
Cadmium	Cadmium	CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
SEPARATE ANALYSES		
Arsenic/AA	Arsenic	AS
Mercury/AA	Mercury	HG
Dibromochloropropane/GC	Dibromochloropropane	DBCP

APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

PHASE II ANALYTES AND CERTIFIED METHODS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
VOLATILE ORGANIC COMPOUNDS/GCMS (Same as Phase I)	VOL	VO
SEMIVOLATILE ORGANIC COMPOUNDS/GCMS (Same as Phase I)	EXTRACTABLE ORGANIC COMPOUNDS (EX)	SVO
VOLATILE HALOCARBON COMPOUNDS/GCCON	PURGEABLE HALOCARBONS (PHC)	VHO
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1-Dichloroethene	1,1-Dichloroethene	11DCE
1,1,1-Trichloroethane (TCA)	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Carbon tetrachloride	Carbon tetrachloride	CCL_4
Chlorobenzene	Chlorobenzene	CLC_6H_5
Chloroform	Chloroform	$CHCL_3$
Methylene chloride	Methylene chloride	CH_2CL_2
Trans 1,2-dichloroethylene	Trans 1,2-dichloroethene	12DCE
Tetrachloroethene (PCE)	Tetrachloroethylene	TCLEE
Trichloroethene (TCE)	Trichloroethylene	TRCLE
VOLATILE HYDROCARBON COMPOUNDS/GCFID	DCPD	HYDCBN
Bicycloheptadiene	Bicycloheptadiene (BCHD)	BCHPD
Dicyclopentadiene	Dicyclopentadiene	DCPD
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
VOLATILE AROMATIC COMPOUNDS/GCPID	PURGEABLE AROMATICS (PAM)	VAO
Benzene	Benzene	C_6H_6
Ethylbenzene	Ethylbenzene	ETC_6H_5
m-Xylene	meta-Xylene	13DMB
o,p-Xylene	ortho- and/or para-Xylene	XYLEN
Toluene	Toluene	MEC_6H_5
ORGANOCHLORINE PESTICIDES/GCEC		OCP
2,2-Bis (para-chlorophenyl)-1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-Bis (para-chlorophenyl)-1,1,1-trichloreoethane	Dichlorodiphenyltrichloroethane	PPDDT
Aldrin	Aldrin	ALDRN
Chlordane	Chlordane	CLDAN
Dieldrin	Dieldrin	DLDRN
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	CL_6CP
Isodrin	Isodrin	ISODR

APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
ORGANOPHOSPHOROUS PESTICIDES/GCNPD	ORGANOPHOSPHOROUS COMPOUNDS (OPC)	OPP
Atrazine	Atrazine	ATZ
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1(2,4-dichlorophenyl) vinyldiethyl phosphate	SUPONA
Vapona	Vapona	DDVP
ORGANOPHOSPHOROUS COMPOUNDS/GCFPD	DIMP	OPC
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP
ORGANOSULPHUR COMPOUNDS/GCFPD		OSC
1,4-Oxathiane	1,4-Oxathiane	OXAT
Benzothiazole	Benzothiazole	BTZ
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	$CPMSO_2$
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Dimethyldisulfide	Dimethyldisulfide	DMDS
Dithiane	Dithiane	DITH
METALS/ICP	ICAP	ICP
Cadmium	Cadmium	CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
SEPARATE ANALYSES		
Arsenic/AA	Arsenic	AS
Mercury/AA	Mercury	HG
Dibromochloropropane/GC	Dibromochloropropane	DBCP

APPENDIX 36-7-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
ARMY AGENT DEGRADATION PRODUCTS:		ADP
AGENT PRODUCTS/HPLC	TDGCL	
Chloroacetic Acid	Chloroacetic acid	CLC2A
Thiodiglycol	Thiodiglycol (TDG)	TDGCL
AGENT PRODUCTS/IONCHROM	IMPA	GBDP
Fluoroacetic acid	Fluoroacetic acid	FC2A
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	IMPA
Methylphosphonic acid	Methylphosphonate	MPA

Methods	Abbreviations
Atomic Absorption Spectroscopy	AA
Gas Chromatography/Conductivity Detector	GCCON
Gas Chromatography/Electron Capture	GCEC
Gas Chromatography/Flame Ionization Detector	GCFID
Gas Chromatography/Flame Photometric	GCFPD
Gas Chromatography/Mass Spectrometry	GCMS
Gas Chromatography/Nitrogen Phosphorous Detector	GCNPD
Gas Chromatography/Photoionizaton Detector	GCPID
High Performance Liquid Chromatography	HPLC
Inductively Coupled Argon Plasma	ICP, ICAP
Ion Chromatography	IONCHROM

APPENDIX 36-7-B
PHASE I CHEMICAL DATA

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS / UNITS	STORET # / METHOD	3117A 367ZA 0	3117B 367ZA 1	3117C 367ZA 2	3118A 367ZA 6	3118B 367ZA 7	3118C 367ZA 8	3119A 367ZA 12	3119B 367ZA 13	3120A 367ZA 18	3120B 367ZA 19	3120C 367ZA 20	3120D 367ZA 21	3120E 367ZA 22	3120F 367ZA 23
DATE / TIME		06/19/85 13:02	06/19/85 13:20	06/19/85 13:45	06/13/85 13:58	06/13/85 14:17	06/13/85 14:41	06/13/85 12:54	06/13/85 13:11	06/17/85 08:11	06/17/85 08:23	06/17/85 08:46	06/17/85 09:15	06/17/85 09:50	06/17/85 10:21
DDE,PP' UG/G-DRY	98363 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
1,4 OXATHIANE UG/G-DRY	98644 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
DIMP UG/G-DRY	98645 0	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
MALATHION UG/G-DRY	98648 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600
ISODRIN UG/G-DRY	98649 0	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
1,4 DITHIANE UG/G- DRY	98650 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
DICYCLOPENTADIENE UG/G-DRY	98651 0	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400
ATRAZINE UG/G-DRY	98655 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700
SUPONA UG/G-DRY.	98656 0	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
DMMP UG/G-DRY	98657 0	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
PARATHION UG/G-DRY	98658 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	<0.800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	3117A 367ZA 0	3117B 367ZA 1	3117C 367ZA 2	3118A 367ZA 6	3118B 367ZA 7	3118C 367ZA 8	3119A 367ZA 12	3119B 367ZA 13	3120A 367ZA 18	3120B 367ZA 19	3120C 367ZA 20	3120D 367ZA 21	3120E 367ZA 22	3120F 367ZA 23
DATE TIME		06/19/85 13:02	06/19/85 13:20	06/19/85 13:45	06/13/85 13:58	06/13/85 14:17	06/13/85 14:41	06/13/85 12:54	06/13/85 13:11	06/17/85 08:11	06/17/85 08:23	06/17/85 08:46	06/17/85 09:15	06/17/85 09:50	06/17/85 10:21
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
TOLUENE UG/G-DRY	98691 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	<0.600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	<0.600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
M-XYLENE UG/G-DRY	98695 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
MIBK UG/G-DRY	98696 0	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.500
DMDS UG/G-DRY	98697 0	NA	NA	<4.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
BENZENE UG/G-DRY	98699 0	NA	NA	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.500
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
CHLOROFORM UG/G-DRY	98682 0	NA	NA	<0.700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	<0.800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
UNK579 UG/G	90043 0	0.642	0.758		0.415	0.334		0.630	0.830						
UNK633 UG/G	90085 0	0.962			2.07		0.646	3.15	2.08						

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	SAMPLE ID/#													
			3117A	3117B	3117C	3118A	3118B	3118C	3119A	3119B	3120A	3120B	3120C	3120D	3120E	3120F
			367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA	367ZA
			0	1	2	6	7	8	12	13	18	19	20	21	22	23
DATE			06/19/85	06/19/85	06/19/85	06/13/85	06/13/85	06/13/85	06/13/85	06/13/85	06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/17/85
TIME			13:02	13:20	13:45	13:58	14:17	14:41	12:54	13:11	08:11	08:23	08:46	09:15	09:50	10:21
UNK614	UG/G	90070 / 0	0.962	11.4	1.25	0.415					0.651	0.866				
UNK636	UG/G	90088 / 0				29.0										
UNK608	UG/G	90065 / 0			0.626	0.415			0.630							
UNK609	UG/G	90066 / 0			1.25		0.445			0.934						
UNK625	UG/G	90078 / 0					3.34									
UNK635	UG/G	90087 / 0	0.642	1.14			12.2	5.38		1.04						
UNK632	UG/G	90084 / 0		1.26	1.25		0.667									
UNK542	UG/G	90024 / 0	0.428						0.735							
UNK517	UG/G	90012 / 0								0.623						
UNK593	UG/G	90052 / 0			0.751											
UNK541	UG/G	90023 / 0														
UNK564	UG/G	90035 / 0														
UNK524	UG/G	90015 / 0									2.53	2.40	2.86	3.32	3.10	3.13
UNK533	UG/G	90021 / 0									0.197					
UNK620	UG/G	90074 / 0														
UNK629	UG/G	90082 / 0														
UNK618	UG/G	90073 / 0									0.245	0.574		0.575	0.829	0.946
UNK619	UG/G	90105 / 0									0.231	0.300	0.354	0.306	0.385	0.377
UNK631	UG/G	90083 / 0											1.10			
UNK523	UG/G	90092 / 0														

PROJECT NUMBER 84936 0300　　PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA　　PROJECT MANAGER BILL FRASER
367ZAS　　LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS / UNITS	STORET # / METHOD	3117A 367ZA 0	3117B 367ZA 1	3117C 367ZA 2	3118A 367ZA 6	3118B 367ZA 7	3118C 367ZA 8	3119A 367ZA 12	3119B 367ZA 13	3120A 367ZA 18	3120B 367ZA 19	3120C 367ZA 20	3120D 367ZA 21	3120E 367ZA 22	3120F 367ZA 23
DATE		06/19/85	06/19/85	06/19/85	06/13/85	06/13/85	06/13/85	06/13/85	06/13/85	06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/17/85
TIME		13:02	13:20	13:45	13:58	14:17	14:41	12:54	13:11	08:11	08:23	08:46	09:15	09:50	10:21
UNK527 UG/G	90017 0														
UNK634 UG/G	90086 0														
UNK638 UG/G	90090 0														
UNK603 UG/G	90060 0														
UNK604 UG/G	90061 0														
UNK624 UG/G	90118 0														
UNK630 UG/G	90106 0														
UNK534 UG/G	90114 0														
UNK581 UG/G	90101 0														

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	3121A 367ZA 24	3121B 367ZA 25	3122A 367ZA 30	3122B 367ZA 31	3122C 367ZA 32	3122D 367ZA 33	3123A 367ZA 36	3123B 367ZA 37	3123C 367ZA 38	3124A 367ZA 42	3124B 367ZA 43	3124C 367ZA 44	3124D 367ZA 45	3124E 367ZA 46
DATE TIME		06/17/85 13:29	06/17/85 13:44	06/19/85 07:58	06/19/85 08:19	06/19/85 08:45	06/19/85 09:17	06/18/85 13:00	06/18/85 13:19	06/18/85 13:44	06/18/85 08:04	06/18/85 08:18	06/18/85 08:46	06/18/85 09:10	06/18/85 09:50
SAMPLE TYPE	71999 0	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE DEPTH FT	99758A 0	0.0	4.00	0.0	4.00	9.00	14.0	0.0	4.00	9.00	0.0	4.00	9.00	14.0	19.0
SITE TYPE 1	99759 0	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE
INSTALLATION CODE SAMPLE	99720 0	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
SAMPLING TECHNIQUE	72005 0	S	S	S	S	S	S	S	S	S	S	S	S	S	S
COORDINATE,N/S STP	98392 0	185029	185029	184910	184910	184910	184910	184810	184810	184810	185523	185523	185523	185523	185523
COORDINATE,E/W STP	98393 0	2185868	2185868	2184635	2184635	2184635	2184635	2184596	2184596	2184596	2184489	2184489	2184489	2184489	2184489
MOISTURE %WET WT	70320 0	3.2	4.4	5.1	7.0	17.9	28.2	5.1	9.1	10.5	6.8	4.7	10.0	16.5	21.6
CADMIUM UG/G- DRY	1028 0	<0.900	<0.900	<0.500	0.700	<0.500	1.00	<0.500	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900	<0.900
CHROMIUM UG/G-DRY	99584 0	8.60	9.30	11.0	21.3	23.6	29.9	12.7	16.1	17.0	9.40	8.70	10.2	11.3	7.80
COPPER UG/G- DRY	1043 0	6.00	7.00	12.0	26.0	24.0	29.0	14.0	19.0	17.0	9.00	7.00	10.0	49.0	81.0
LEAD UG/G-DRY	1052 0	<17.0	<17.0	<16.0	20.0	<16.0	25.0	19.0	<16.0	<16.0	25.0	<17.0	<17.0	31.0	33.0
ZINC UG/G-DRY	1093 0	33.0	38.0	<28.0	51.0	63.0	68.0	32.0	43.0	40.0	49.0	34.0	36.0	98.0	47.0
ARSENIC UG/G- DRY	1003 0	<4.70	<4.70	<5.20	<5.20	<5.20	<5.20	<5.20	<5.20	<5.20	5.80	<4.70	7.50	10.0	17.0
MERCURY UG/G-DRY	71921 0	<0.050	<0.050	<0.070	<0.070	<0.070	0.350	<0.070	<0.070	<0.070	<0.050	<0.050	<0.050	0.070	0.160
ALDRIN UG/G- DRY	98356 0	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900	NA
DIELDRIN UG/G-DRY	98365 0	<0.300	<0.300	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.300	<0.300	<0.300	<0.300	NA
DDT,PP' UG/G-DRY	98364 0	<0.400	<0.400	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.400	<0.400	<0.400	<0.400	NA
ENDRIN UG/G-DRY.	98369 0	<0.700	<0.700	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<0.700	<0.700	<0.700	<0.700	NA
CHLORDANE UG/G- DRY	98361 0	<1.00	<1.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<1.00	<1.00	<1.00	<1.00	NA

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS UNITS	STORET # METHOD	SAMPLE ID/# 3121A 367ZA 24	3121B 367ZA 25	3122A 367ZA 30	3122B 367ZA 31	3122C 367ZA 32	3122D 367ZA 33	3123A 367ZA 36	3123B 367ZA 37	3123C 367ZA 38	3124A 367ZA 42	3124B 367ZA 43	3124C 367ZA 44	3124D 367ZA 45	3124E 367ZA 46
DATE TIME		06/17/85 13:29	06/17/85 13:44	06/19/85 07:58	06/19/85 08:19	06/19/85 08:45	06/19/85 09:17	06/18/85 13:00	06/18/85 13:19	06/18/85 13:44	06/18/85 08:04	06/18/85 08:18	06/18/85 08:46	06/18/85 09:10	06/18/85 09:50
DDE,PP' UG/G-DRY	98363 0	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	NA
1,4 OXATHIANE UG/G-DRY	98644 0	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	NA
DIMP UG/G-DRY	98645 0	<0.500	<0.500	<3.00	<3.00	3.23	3.70	<3.00	<3.00	<3.00	<0.500	<0.500	<0.500	<0.500	NA
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	NA
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	NA
MALATHION UG/G-DRY	98648 0	<0.600	<0.600	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.600	<0.600	<0.600	<0.600	NA
ISODRIN UG/G-DRY	98649 0	<0.300	<0.300	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.300	<0.300	<0.300	<0.300	NA
1,4 DITHIANE UG/G- DRY	98650 0	<0.300	<0.300	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.300	<0.300	<0.300	<0.300	NA
DICYCLOPENTADIENE UG/G-DRY	98651 0	<0.300	<0.300	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<0.300	<0.300	<0.300	<0.300	NA
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	NA
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<0.400	<0.400	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	NA
ATRAZINE UG/G-DRY	98655 0	<0.700	<0.700	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.700	<0.700	<0.700	<0.700	NA
SUPONA UG/G-DRY.	98656 0	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	NA
DMMP UG/G-DRY	98657 0	<2.00	<2.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<2.00	<2.00	<2.00	<2.00	NA
PARATHION UG/G-DRY	98658 0	<0.700	<0.700	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.700	<0.700	<0.700	<0.700	NA
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.300	<0.300	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.300	<0.300	<0.300	<0.300	NA
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	NA	NA	NA	<0.800	NA	NA	NA	NA	NA	NA	NA	<0.300
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	NA	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	<0.300
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	<0.300

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3121A 367ZA 24	3121B 367ZA 25	3122A 367ZA 30	3122B 367ZA 31	3122C 367ZA 32	3122D 367ZA 33	3123A 367ZA 36	3123B 367ZA 37	3123C 367ZA 38	3124A 367ZA 42	3124B 367ZA 43	3124C 367ZA 44	3124D 367ZA 45	3124E 367ZA 46
DATE		06/17/85	06/17/85	06/19/85	06/19/85	06/19/85	06/19/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
TIME		13:29	13:44	07:58	08:19	08:45	09:17	13:00	13:19	13:44	08:04	08:18	08:46	09:10	09:50
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	NA	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	<0.300
TOLUENE UG/G-DRY	98691 0	NA	NA	NA	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	NA	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	NA	NA	NA	<0.600	NA	NA	NA	NA	NA	NA	NA	<0.300
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	NA	NA	NA	<0.600	NA	NA	NA	NA	NA	NA	NA	<0.300
M-XYLENE UG/G-DRY	98695 0	NA	NA	NA	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	<0.300
MIBK UG/G-DRY	98696 0	NA	NA	NA	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	<0.500
DMDS UG/G-DRY	98697 0	NA	NA	NA	NA	NA	<4.00	NA	NA	NA	NA	NA	NA	NA	<0.300
BENZENE UG/G-DRY	98699 0	NA	NA	NA	NA	NA	<1.00	NA	NA	NA	NA	NA	NA	NA	<0.300
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	NA	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	<0.500
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	NA	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	<0.300
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	NA	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	<0.300
CHLOROFORM UG/G-DRY	98682 0	NA	NA	NA	NA	NA	<0.700	NA	NA	NA	NA	NA	NA	NA	<0.300
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	NA	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	<0.300
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	NA	NA	NA	<0.400	NA	NA	NA	NA	NA	NA	NA	<0.300
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	NA	NA	NA	<0.800	NA	NA	NA	NA	NA	NA	NA	<0.300
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
UNK579 UG/G	90043 0				0.538		0.836	0.527	0.550	1.01					
UNK633 UG/G	90085 0			0.421				1.05							

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	3121A 367ZA 24	3121B 367ZA 25	3122A 367ZA 30	3122B 367ZA 31	3122C 367ZA 32	3122D 367ZA 33	3123A 367ZA 36	3123B 367ZA 37	3123C 367ZA 38	3124A 367ZA 42	3124B 367ZA 43	3124C 367ZA 44	3124D 367ZA 45	3124E 367ZA 46
DATE			06/17/85	06/17/85	06/19/85	06/19/85	06/19/85	06/19/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
TIME			13:29	13:44	07:58	08:19	08:45	09:17	13:00	13:19	13:44	08:04	08:18	08:46	09:10	09:50
UNK614	UG/G	90070 0				0.430					2.23					
UNK636	UG/G	90088 0														
UNK608	UG/G	90065 0														
UNK609	UG/G	90066 0		0.532								1.72	0.174	0.721	0.404	
UNK625	UG/G	90078 0														
UNK635	UG/G	90087 0			0.737	2.15		0.836	3.16	1.10						
UNK632	UG/G	90084 0				0.968	0.731	2.79			1.12					
UNK542	UG/G	90024 0									0.447					
UNK517	UG/G	90012 0			0.527		0.609		0.422	0.440	0.782					
UNK593	UG/G	90052 0														
UNK541	UG/G	90023 0				0.215										
UNK564	UG/G	90035 0						0.836								
UNK524	UG/G	90015 0														
UNK533	UG/G	90021 0	0.332	0.197									0.274			
UNK620	UG/G	90074 0														
UNK629	UG/G	90082 0														
UNK618	UG/G	90073 0	0.225											2.88		
UNK619	UG/G	90105 0	0.288										0.303	0.526	0.446	
UNK631	UG/G	90083 0														
UNK523	UG/G	90092 0	0.548	0.282								0.548	0.434	0.395	0.658	

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # METHOD	3121A 367ZA 24	3121B 367ZA 25	3122A 367ZA 30	3122B 367ZA 31	3122C 367ZA 32	3122D 367ZA 33	3123A 367ZA 36	3123B 367ZA 37	3123C 367ZA 38	3124A 367ZA 42	3124B 367ZA 43	3124C 367ZA 44	3124D 367ZA 45	3124E 367ZA 46
		SAMPLE ID/#														
DATE			06/17/85	06/17/85	06/19/85	06/19/85	06/19/85	06/19/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85	06/18/85
TIME			13:29	13:44	07:58	08:19	08:45	09:17	13:00	13:19	13:44	08:04	08:18	08:46	09:10	09:50
UNK527	UG/G	90017 0	0.198													
UNK634	UG/G	90086 0		0.206												
UNK638	UG/G	90090 0		0.341												
UNK603	UG/G	90060 0										1.18				
UNK604	UG/G	90061 0										1.79		0.626	0.388	
UNK624	UG/G	90118 0										0.803				
UNK630	UG/G	90106 0											0.571		0.304	
UNK534	UG/G	90114 0														
UNK581	UG/G	90101 0														

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3125A 367ZA 48	3125B 367ZA 49	3125C 367ZA 50	BLK 367ZA 80	BLK 367ZA 81	BLK 367ZA 82	BLK 367ZA 90	BLK 367ZA 91	BLK 367ZA 92
DATE / TIME		06/17/85 14:37	06/17/85 14:52	06/17/85 15:12	06/17/85 00:00	06/17/85 00:00	06/18/85 00:00	06/17/85 00:00	06/17/85 00:00	06/17/85 00:00
SAMPLE TYPE	71999 0	SO	SO	SO	OSO	SO	SO	SO	SO	SO
SAMPLE DEPTH FT	99758A 0	0.0	4.00	9.00	0.0	0.0	0.0	0.0	0.0	0.0
SITE TYPE 1	99759 0	BORE	BORE	BORE	QCMB	QCMB	QCMB	QCMB	QCMB	QCMB
INSTALLATION CODE	99720 0	RK	RK	RK	RK	RK	RK	RK	RK	RK
SAMPLE SAMPLING TECHNIQUE	72005 0	S	S	S	G	G	G	G	G	G
COORDINATE,N/S STP	98392 0	185451	185451	185451						
COORDINATE,E/W STP	98393 0	2184561	2184561	2184561						
MOISTURE %WET WT	70320 0	2.3	5.4	8.0	2.5	2.5	2.5	2.0	2.0	2.0
CADMIUM UG/G- DRY	1028 0	<0.900	<0.900	<0.900	NA	NA	NA	NA	NA	NA
CHROMIUM UG/G-DRY	99584 0	7.60	14.5	7.40	NA	NA	NA	NA	NA	NA
COPPER UG/G- DRY	1043 0	7.00	11.0	10.0	NA	NA	NA	NA	NA	NA
LEAD UG/G-DRY	1052 0	23.0	19.0	<17.0	NA	NA	NA	NA	NA	NA
ZINC UG/G-DRY	1093 0	32.0	48.0	34.0	NA	NA	NA	NA	NA	NA
ARSENIC UG/G- DRY	1003 0	<4.70	6.60	5.50	NA	NA	NA	NA	NA	NA
MERCURY UG/G-DRY	71921 0	0.070	<0.050	0.050	NA	NA	NA	<0.070	NA	NA
ALDRIN UG/G- DRY	98356 0	<0.900	<0.900	<0.900	<0.900	<0.900		<0.500		
DIELDRIN UG/G-DRY	98365 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.600		
DDT,PP' UG/G-DRY	98364 0	<0.400	<0.400	<0.400	<0.400	<0.400		<2.00		
ENDRIN UG/G-DRY.	98369 0	<0.700	<0.700	<0.700	<0.700	<0.700		<4.00		
CHLORDANE UG/G- DRY	98361 0	<1.00	<1.00	<1.00	<1.00	<1.00		<6.00		

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS UNITS	STORET # METHOD	3125A 367ZA 48	3125B 367ZA 49	3125C 367ZA 50	BLK 367ZA 80	BLK 367ZA 81	BLK 367ZA 82	SAMPLE ID/# BLK 367ZA 90	BLK 367ZA 91	BLK 367ZA 92
DATE		06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/18/85	06/17/85	06/17/85	06/17/85
TIME		14:37	14:52	15:12	00:00	00:00	00:00	00:00	00:00	00:00
DDE,PP' UG/G-DRY	98363 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.500		
1,4 OXATHIANE UG/G-DRY	98644 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.500		
DIMP UG/G-DRY	98645 0	<0.500	<0.500	<0.500	<0.500	<0.500		<3.00		
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.300		
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00		<1.00		
MALATHION UG/G-DRY	98648 0	<0.600	<0.600	<0.600	<0.600	<0.600		<2.00		
ISODRIN UG/G-DRY	98649 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.600		
1,4 DITHIANE UG/G- DRY	98650 0	<0.300	<0.300	<0.300	<0.300	<0.300		<2.00		
DICYCLOPENTADIENE UG/G-DRY	98651 0	<0.300	<0.300	<0.300	<0.300	<0.300		<6.00		
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.300		
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<0.400	<0.400	<0.400	<0.400	<0.400		<1.00		
ATRAZINE UG/G-DRY	98655 0	<0.700	<0.700	<0.700	<0.700	<0.700		<0.500		
SUPONA UG/G-DRY.	98656 0	<0.500	<0.500	<0.500	<0.500	<0.500		<0.900		
DMMP UG/G-DRY	98657 0	<2.00	<2.00	<2.00	<2.00	<2.00		<3.00		
PARATHION UG/G-DRY	98658 .0	<0.700	<0.700	<0.700	<0.700	<0.700		<2.00		
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.300	<0.300	<0.300	<0.300	<0.300		<0.400		
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	NA	<0.300			<0.800	<0.800	
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	NA	<0.300			<0.400	<0.400	
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA	NA	0.914					

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3125A 367ZA 48	3125B 367ZA 49	3125C 367ZA 50	BLK 367ZA 80	BLK 367ZA 81	BLK 367ZA 82	BLK 367ZA 90	BLK 367ZA 91	BLK 367ZA 92
		SAMPLE ID/#								
DATE		06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/18/85	06/17/85	06/17/85	06/17/85
TIME		14:37	14:52	15:12	00:00	00:00	00:00	00:00	00:00	00:00
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	NA	<0.300			<0.500	<0.500	
TOLUENE UG/G-DRY	98691 0	NA	NA	NA	<0.300			<0.300	<0.300	
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	NA	0.527			<0.500	<0.500	
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	NA	<0.300			<0.600	<0.600	
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	NA	<0.300			<0.600	<0.600	
M-XYLENE UG/G-DRY	98695 0	NA	NA	NA	<0.300			<0.300	<0.300	
MIBK UG/G-DRY	98696 0	NA	NA	NA	<0.500			<0.400	<0.400	
DMDS UG/G-DRY	98697 0	NA	NA	NA	<0.300			<4.00	<4.00	
BENZENE UG/G-DRY	98699 0	NA	NA	NA	<0.300			<1.00	<1.00	
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	NA	<0.500			<0.500	<0.500	
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	NA	<0.300			<0.400	<0.400	
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	NA	<0.300			<0.300	<0.300	
CHLOROFORM UG/G-DRY	98682 0	NA	NA	NA	1.11			<0.700	<0.700	
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	NA	<0.300			<0.500	<0.500	
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	NA	<0.300			<0.400	<0.400	
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	NA	<0.300			<0.800	<0.800	
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
UNK579 UG/G	90043 0									
UNK633 UG/G	90085 0									

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367ZA PROJECT MANAGER BILL FRASER
367ZAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	3125A 367ZA 48	3125B 367ZA 49	3125C 367ZA 50	BLK 367ZA 80	BLK 367ZA 81	BLK 367ZA 82	BLK 367ZA 90	BLK 367ZA 91	BLK 367ZA 92
DATE			06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/18/85	06/17/85	06/17/85	06/17/85
TIME			14:37	14:52	15:12	00:00	00:00	00:00	00:00	00:00	00:00
UNK614	UG/G	90070 / 0				0.512					
UNK636	UG/G	90088 / 0									
UNK608	UG/G	90065 / 0									
UNK609	UG/G	90066 / 0			0.873						
UNK625	UG/G	90078 / 0									
UNK635	UG/G	90087 / 0									
UNK632	UG/G	90084 / 0									
UNK542	UG/G	90024 / 0									
UNK517	UG/G	90012 / 0							0.612		
UNK593	UG/G	90052 / 0									
UNK541	UG/G	90023 / 0									
UNK564	UG/G	90035 / 0									
UNK524	UG/G	90015 / 0				3.08					
UNK533	UG/G	90021 / 0				0.270					
UNK620	UG/G	90074 / 0				0.462					
UNK629	UG/G	90082 / 0				0.507					
UNK618	UG/G	90073 / 0	0.538		1.88						
UNK619	UG/G	90105 / 0	0.351	0.364	0.552		0.279				
UNK631	UG/G	90083 / 0		7.85							
UNK523	UG/G	90092 / 0									

PROJECT NUMBER 84936 0300
FIELD GROUP 367ZA
367ZAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3125A 367ZA 48	3125B 367ZA 49	3125C 367ZA 50	BLK 367ZA 80	BLK 367ZA 81	BLK 367ZA 82	BLK 367ZA 90	BLK 367ZA 91	BLK 367ZA 92
		SAMPLE ID/#								
DATE		06/17/85	06/17/85	06/17/85	06/17/85	06/17/85	06/18/85	06/17/85	06/17/85	06/17/85
TIME		14:37	14:52	15:12	00:00	00:00	00:00	00:00	00:00	00:00
UNK527 UG/G	90017 0									
UNK634 UG/G	90086 0									
UNK638 UG/G	90090 0	0.223	1.53							
UNK603 UG/G	90060 0									
UNK604 UG/G	90061 0	0.515	0.430							
UNK624 UG/G	90118 0			0.544						
UNK630 UG/G	90106 0									
UNK534 UG/G	90114 0		0.318							
UNK581 UG/G	90101 0			0.475						

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	3105A 367YA 0	3105B 367YA 1	3105C 367YA 2	3106A 367YA 6	3106B 367YA 7	3107A 367YA 12	3107B 367YA 13	3107C 367YA 14	3108A 367YA 18	3108B 367YA 19	3109A 367YA 24	3109B 367YA 25	3110A 367YA 30	3110B 367YA 31
DATE TIME		06/10/85 14:01	06/10/85 14:18	06/10/85 14:33	06/10/85 10:21	06/10/85 10:39	06/10/85 15:23	06/10/85 15:39	06/10/85 16:03	06/10/85 11:18	06/10/85 11:39	06/12/85 10:55	06/12/85 11:10	06/12/85 07:50	06/12/85 08:06
SAMPLE TYPE	71999 0	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE DEPTH FT	99758A 0	0.0	4.00	9.00	0.0	4.00	0.0	4.00	9.00	0.0	4.00	0.0	4.00	0.0	4.00
SITE TYPE 1	99759 0	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE
INSTALLATION CODE SAMPLE	99720 0	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
SAMPLING TECHNIQUE	72005 0	S	S	S	S	S	S	S	S	S	S	S	S	S	S
COORDINATE,N/S STP	98392 0	185711	185711	185711	185714	185714	185603	185603	185603	185610	185610	185410	185410	185410	185410
COORDINATE,E/W STP	98393 0	2185160	2185160	2185160	2185668	2185668	2185571	2185571	2185571	2185271	2185271	2185063	2185063	2185368	2185368
MOISTURE %WET WT	70320 0	4.7	13.9	12.5	2.3	5.0	3.4	3.2	10.9	6.6	9.0	6.3	24.2	3.3	7.3
CADMIUM UG/G- DRY	1028 0	<0.900	3.30	<0.900	2.10	<0.900	<0.900	<0.900	<0.900	1.10	1.80	<0.500	0.900	<0.500	<0.500
CHROMIUM UG/G-DRY	99584 0	13.0	10.0	9.00	10.0	13.0	10.0	10.0	22.0	9.00	15.0	14.0	22.0	11.0	12.0
COPPER UG/G- DRY	1043 0	13.0	16.0	14.0	8.00	10.0	8.00	6.00	12.0	8.00	8.00	30.0	29.0	16.0	12.0
LEAD UG/G-DRY	1052 0	22.0	23.0	<17.0	27.0	18.0	<17.0	<17.0	18.0	<17.0	20.0	<16.0	<16.0	<16.0	<16.0
ZINC UG/G-DRY	1093 0	49.0	58.0	64.0	33.0	39.0	28.0	28.0	49.0	31.0	39.0	49.0	64.0	34.0	39.0
ARSENIC UG/G- DRY	1003 0	5.40	5.00	<4.70	<4.70	4.80	<4.70	<4.70	5.50	<4.70	5.30	<5.20	<5.20	<5.20	<5.20
MERCURY UG/G-DRY	71921 0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070	<0.070	<0.070	<0.070
ALDRIN UG/G- DRY	98356 0	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500
DIELDRIN UG/G-DRY	98365 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.600	<0.600	<0.600	<0.600
DDT,PP' UG/G-DRY	98364 0	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<2.00	<2.00	<2.00	<2.00
ENDRIN UG/G-DRY.	98369 0	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<4.00	<4.00	<4.00	<4.00
CHLORDANE UG/G- DRY	98361 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<6.00	<6.00	<6.00	<6.00

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	3105A 367YA 0	3105B 367YA 1	3105C 367YA 2	3106A 367YA 6	3106B 367YA 7	3107A 367YA 12	3107B 367YA 13	3107C 367YA 14	3108A 367YA 18	3108B 367YA 19	3109A 367YA 24	3109B 367YA 25	3110A 367YA 30	3110B 367YA 31
DATE		06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/12/85	06/12/85	06/12/85	06/12/85
TIME		14:01	14:18	14:33	10:21	10:39	15:23	15:39	16:03	11:18	11:39	10:55	11:10	07:50	08:06
DDE,PP' UG/G-DRY	98363 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500
1,4 OXATHIANE UG/G-DRY	98644 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500
DIMP UG/G-DRY	98645 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<3.00	<3.00	<3.00	<3.00
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
MALATHION UG/G-DRY	98648 0	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<2.00	<2.00	<2.00	<2.00
ISODRIN UG/G-DRY	98649 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.600	<0.600	<0.600	<0.600
1,4 DITHIANE UG/G- DRY	98650 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<2.00	<2.00	<2.00	<2.00
DICYCLOPENTADIENE UG/G-DRY	98651 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<6.00	<6.00	<6.00	<6.00
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<1.00	<1.00	<1.00	<1.00
ATRAZINE UG/G-DRY	98655 0	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.500	<0.500	<0.500	<0.500
SUPONA UG/G-DRY.	98656 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900
DMMP UG/G-DRY	98657 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<3.00	<3.00	<3.00	<3.00
PARATHION UG/G-DRY	98658 0	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<0.700	<2.00	<2.00	<2.00	<2.00
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.400	<0.400	<0.400	<0.400
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ENVIRONMENTAL SCIENCE & ENGINEERING 02/05/87 STATUS: ACTIVE PAGE# 3

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS UNITS	STORET # METHOD	SAMPLE ID/# 3105A 367YA 0	3105B 367YA 1	3105C 367YA 2	3106A 367YA 6	3106B 367YA 7	3107A 367YA 12	3107B 367YA 13	3107C 367YA 14	3108A 367YA 18	3108B 367YA 19	3109A 367YA 24	3109B 367YA 25	3110A 367YA 30	3110B 367YA 31
DATE		06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/12/85	06/12/85	06/12/85	06/12/85
TIME		14:01	14:18	14:33	10:21	10:39	15:23	15:39	16:03	11:18	11:39	10:55	11:10	07:50	08:06
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOLUENE UG/G-DRY	98691 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
M-XYLENE UG/G-DRY	98695 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MIBK UG/G-DRY	98696 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DMDS UG/G-DRY	98697 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZENE UG/G-DRY	98699 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM UG/G-DRY	98682 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
UNK542 UG/G	90024 0														
UNK609 UG/G	90066 0	0.524		2.08	1.17										

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	3105A 367YA 0	3105B 367YA 1	3105C 367YA 2	3106A 367YA 6	3106B 367YA 7	3107A 367YA 12	3107B 367YA 13	3107C 367YA 14	3108A 367YA 18	3108B 367YA 19	3109A 367YA 24	3109B 367YA 25	3110A 367YA 30	3110B 367YA 31
DATE			06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/12/85	06/12/85	06/12/85	06/12/85
TIME			14:01	14:18	14:33	10:21	10:39	15:23	15:39	16:03	11:18	11:39	10:55	11:10	07:50	08:06
UNK635	UG/G	90087 / 0											4.27	2.64		
UNK633	UG/G	90085 / 0														
UNK579	UG/G	90043 / 0														
UNK632	UG/G	90084 / 0														
UNK608	UG/G	90065 / 0														
UNK629	UG/G	90082 / 0														
UNK604	UG/G	90061 / 0			2.24	1.78										
UNK614	UG/G	90070 / 0														
UNK636	UG/G	90088 / 0														
UNK625	UG/G	90078 / 0														
UNK613	UG/G	90069 / 0												5.28		
UNK628	UG/G	90081 / 0													6.21	
UNK546	UG/G	90028 / 0														
UNK577	UG/G	90041 / 0														
UNK594	UG/G	90053 / 0														
UNK605	UG/G	90062 / 0														
UNK598	UG/G	90056 / 0														
UNK618	UG/G	90073 / 0	1.07	0.202		0.913					0.756					
UNK548	UG/G	90029 / 0														
UNK523	UG/G	90092 / 0	1.08				0.527									

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS	UNITS	STORET # / METHOD	3105A 367YA 0	3105B 367YA 1	3105C 367YA 2	3106A 367YA 6	3106B 367YA 7	3107A 367YA 12	3107B 367YA 13	3107C 367YA 14	3108A 367YA 18	3108B 367YA 19	3109A 367YA 24	3109B 367YA 25	3110A 367YA 30	3110B 367YA 31
DATE			06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/10/85	06/12/85	06/12/85	06/12/85	06/12/85
TIME			14:01	14:18	14:33	10:21	10:39	15:23	15:39	16:03	11:18	11:39	10:55	11:10	07:50	08:06
UNK533	UG/G	90021 / 0	1.15													
UNK534	UG/G	90114 / 0														
UNK637	UG/G	90089 / 0														
UNK527	UG/G	90017 / 0	0.916													
UNK619	UG/G	90105 / 0		0.321					0.291		0.580	0.319				
UNK603	UG/G	90060 / 0			1.54											
UNK624	UG/G	90118 / 0			1.25	0.753					0.536					
UNK513	UG/G	90116 / 0					0.231		0.290							
UNK515	UG/G	90010 / 0					0.327		0.280		1.31	0.421				
UNK516	UG/G	90011 / 0					0.357		0.252		1.12					
UNK530	UG/G	90019 / 0					0.245									
UNK611	UG/G	90067 / 0										0.459				
UNK581	UG/G	90101 / 0														

ENVIRONMENTAL SCIENCE & ENGINEERING 02/05/87 STATUS: ACTIVE PAGE# 6

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	SAMPLE ID/# 3110C 367YA 32	3110D 367YA 33	3110E 367YA 34	3111A 367YA 36	3111B 367YA 37	3112A 367YA 42	3112B 367YA 43	3112C 367YA 44	3113A 367YA 48	3113B 367YA 49	3114A 367YA 54	3114B 367YA 55	3114C 367YA 56	3115A 367YA 60
DATE / TIME		06/12/85 08:32	06/12/85 09:07	06/12/85 00:00	06/11/85 07:56	06/11/85 08:12	06/11/85 08:45	06/11/85 09:03	06/11/85 09:22	06/12/85 13:20	06/12/85 13:38	06/13/85 07:43	06/13/85 07:58	06/13/85 08:18	06/13/85 10:18
SAMPLE TYPE	71999 / 0	SO	SO	SO	SO	SO	SO	SO	SO	OSO	SO	SO	SO	SO	SO
SAMPLE DEPTH / FT	99758A / 0	9.00	14.0	19.0	0.0	4.00	1.00	4.00	8.00	0.0	4.00	0.0	4.00	9.00	0.0
SITE TYPE 1	99759 / 0	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE	BORE
INSTALLATION CODE / SAMPLE	99720 / 0	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
SAMPLING TECHNIQUE	72005 / 0	S	S	S	S	S	S	S	S	S	S	S	S	S	S
COORDINATE,N/S / STP	98392 / 0	185410	185410	185410	185312	185312	185311	185311	185311	185307	185307	185111	185111	185111	185115
COORDINATE,E/W / STP	98393 / 0	2185368	2185368	2185368	2185671	2185671	2185470	2185470	2185470	2185169	2185169	2185060	2185060	2185060	2185373
MOISTURE / %WET WT	70320 / 0	13.3	19.4	20.1	8.4	8.9	8.6	10.1	7.0	10.1	8.4	3.2	5.4	13.9	8.0
CADMIUM / UG/G- DRY	1028 / 0	<0.500	<0.500	<0.500	5.10	<0.900	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
CHROMIUM / UG/G-DRY	99584 / 0	14.0	13.0	17.0	16.0	16.0	14.0	20.0	13.0	14.0	18.0	<7.00	10.0	17.0	14.0
COPPER / UG/G- DRY	1043 / 0	15.0	43.0	48.0	9.00	7.00	7.00	11.0	10.0	14.0	17.0	14.0	11.0	16.0	15.0
LEAD / UG/G-DRY	1052 / 0	<16.0	<16.0	<16.0	18.0	<17.0	19.0	23.0	20.0	<16.0	<16.0	<16.0	<16.0	<16.0	<16.0
ZINC / UG/G-DRY	1093 / 0	38.0	82.0	91.0	39.0	42.0	40.0	54.0	44.0	40.0	45.0	32.0	<28.0	49.0	91.0
ARSENIC / UG/G- DRY	1003 / 0	<5.20	<5.20	<5.20	7.10	5.80	5.90	6.60	6.90	<5.20	<5.20	<5.20	<5.20	<5.20	<5.20
MERCURY / UG/G-DRY	71921 / 0	<0.070	<0.070	<0.070	<0.050	<0.050	<0.050	<0.050	<0.050	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
ALDRIN / UG/G- DRY	98356 / 0	<0.500	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
DIELDRIN / UG/G-DRY	98365 / 0	<0.600	<0.600	<0.600	<0.300	<0.300	<0.300	<0.300	<0.300	<0.600	0.810	<0.600	<0.600	<0.600	1.35
DDT,PP' / UG/G-DRY	98364 / 0	<2.00	<2.00	<2.00	<0.400	<0.400	<0.400	<0.400	<0.400	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
ENDRIN / UG/G-DRY.	98369 / 0	<4.00	<4.00	<4.00	<0.700	<0.700	<0.700	<0.700	<0.700	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00
CHLORDANE / UG/G- DRY	98361 / 0	<6.00	<6.00	<6.00	<1.00	<1.00	<1.00	<1.00	<1.00	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00

ENVIRONMENTAL SCIENCE & ENGINEERING 02/05/87 STATUS: ACTIVE PAGE# 7

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	3110C 367YA 32	3110D 367YA 33	3110E 367YA 34	3111A 367YA 36	3111B 367YA 37	3112A 367YA 42	3112B 367YA 43	3112C 367YA 44	3113A 367YA 48	3113B 367YA 49	3114A 367YA 54	3114B 367YA 55	3114C 367YA 56	3115A 367YA 60
DATE TIME		06/12/85 08:32	06/12/85 09:07	06/12/85 00:00	06/11/85 07:56	06/11/85 08:12	06/11/85 08:45	06/11/85 09:03	06/11/85 09:22	06/12/85 13:20	06/12/85 13:38	06/13/85 07:43	06/13/85 07:58	06/13/85 08:18	06/13/85 10:18
DDE,PP' UG/G-DRY	98363 0	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
1,4 OXATHIANE UG/G-DRY	98644 0	<0.500	<0.500	<0.500	<0.300	<0.300	<0.300	<0.300	<0.300	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
DIMP UG/G-DRY	98645 0	<3.00	<3.00	<3.00	<0.500	<0.500	<0.500	<0.500	<0.500	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
MALATHION UG/G-DRY	98648 0	<2.00	<2.00	<2.00	<0.600	<0.600	<0.600	<0.600	<0.600	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
ISODRIN UG/G-DRY	98649 0	<0.600	<0.600	<0.600	<0.300	<0.300	<0.300	<0.300	<0.300	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600
1,4 DITHIANE UG/G- DRY	98650 0	<2.00	<2.00	<2.00	<0.300	<0.300	<0.300	<0.300	<0.300	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
DICYCLOPENTADIENE UG/G-DRY	98651 0	<6.00	<6.00	<6.00	<0.300	<0.300	<0.300	<0.300	<0.300	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<1.00	<1.00	<1.00	<0.400	<0.400	<0.400	<0.400	<0.400	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
ATRAZINE UG/G-DRY	98655 0	<0.500	<0.500	<0.500	<0.700	<0.700	<0.700	<0.700	<0.700	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
SUPONA UG/G-DRY.	98656 0	<0.900	<0.900	<0.900	<0.500	<0.500	<0.500	<0.500	<0.500	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900
DMMP UG/G-DRY	98657 0	<3.00	<3.00	<3.00	<2.00	<2.00	<2.00	<2.00	<2.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00
PARATHION UG/G-DRY	98658 0	<2.00	<2.00	<2.00	<0.700	<0.700	<0.700	<0.700	<0.700	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.400	<0.400	<0.400	<0.300	<0.300	<0.300	<0.300	<0.300	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	SAMPLE ID/# 3110C	3110D	3110E	3111A	3111B	3112A	3112B	3112C	3113A	3113B	3114A	3114B	3114C	3115A
		367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA	367YA
		32	33	34	36	37	42	43	44	48	49	54	55	56	60
DATE		06/12/85	06/12/85	06/12/85	06/11/85	06/11/85	06/11/85	06/11/85	06/11/85	06/12/85	06/12/85	06/13/85	06/13/85	06/13/85	06/13/85
TIME		08:32	09:07	00:00	07:56	08:12	08:45	09:03	09:22	13:20	13:38	07:43	07:58	08:18	10:18
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOLUENE UG/G-DRY	98691 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
M-XYLENE UG/G-DRY	98695 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MIBK UG/G-DRY	98696 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DMDS UG/G-DRY	98697 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZENE UG/G-DRY	98699 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	<0.500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHLOROFORM UG/G-DRY	98682 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	<0.300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
UNK542 UG/G	90024 0			1.00							1.09		0.846	0.465	1.09
UNK609 UG/G	90066 0									0.556		0.723			

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	3110C 367YA 32	3110D 367YA 33	3110E 367YA 34	3111A 367YA 36	3111B 367YA 37	3112A 367YA 42	3112B 367YA 43	3112C 367YA 44	3113A 367YA 48	3113B 367YA 49	3114A 367YA 54	3114B 367YA 55	3114C 367YA 56	3115A 367YA 60
DATE / TIME			06/12/85 08:32	06/12/85 09:07	06/12/85 00:00	06/11/85 07:56	06/11/85 08:12	06/11/85 08:45	06/11/85 09:03	06/11/85 09:22	06/12/85 13:20	06/12/85 13:38	06/13/85 07:43	06/13/85 07:58	06/13/85 08:18	06/13/85 10:18
UNK635	UG/G	90087 0			3.75	0.217		0.308			2.22	4.37	2.07	5.29	2.32	
UNK633	UG/G	90085 0														
UNK579	UG/G	90043 0									0.334			0.423		6.52
UNK632	UG/G	90084 0	0.807	0.496							0.445	0.764		0.634	1.05	
UNK608	UG/G	90065 0														
UNK629	UG/G	90082 0														
UNK604	UG/G	90061 0														
UNK614	UG/G	90070 0		0.744												
UNK636	UG/G	90088 0														
UNK625	UG/G	90078 0														
UNK613	UG/G	90069 0			1.13											
UNK628	UG/G	90081 0										0.437				
UNK546	UG/G	90028 0											2.07			
UNK577	UG/G	90041 0														7.61
UNK594	UG/G	90053 0														1.09
UNK605	UG/G	90062 0														1.09
UNK598	UG/G	90056 0														
UNK618	UG/G	90073 0						0.257								
UNK548	UG/G	90029 0														
UNK523	UG/G	90092 0														

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3110C 367YA 32	3110D 367YA 33	3110E 367YA 34	3111A 367YA 36	3111B 367YA 37	3112A 367YA 42	3112B 367YA 43	3112C 367YA 44	3113A 367YA 48	3113B 367YA 49	3114A 367YA 54	3114B 367YA 55	3114C 367YA 56	3115A 367YA 60
DATE		06/12/85	06/12/85	06/12/85	06/11/85	06/11/85	06/11/85	06/11/85	06/11/85	06/12/85	06/12/85	06/13/85	06/13/85	06/13/85	06/13/85
TIME		08:32	09:07	00:00	07:56	08:12	08:45	09:03	09:22	13:20	13:38	07:43	07:58	08:18	10:18
UNK533 UG/G	90021 0														
UNK534 UG/G	90114 0														
UNK637 UG/G	90089 0														
UNK527 UG/G	90017 0														
UNK619 UG/G	90105 0				0.285		0.285		0.322						
UNK603 UG/G	90060 0														
UNK624 UG/G	90118 0														
UNK513 UG/G	90116 0								0.266						
UNK515 UG/G	90010 0				0.267										
UNK516 UG/G	90011 0				0.241										
UNK530 UG/G	90019 0														
UNK611 UG/G	90067 0														
UNK581 UG/G	90101 0								0.273						

PROJECT NUMBER 84936 0300 PROJECT NAME SECTION 36 RMA
FIELD GROUP 367YA PROJECT MANAGER BILL FRASER
367YAS LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3115B 367YA 61	3116A 367YA 66	3116B 367YA 67	3116C 367YA 68	3110Y 367YA 72	3113Z 367YA 73	BLK 367YA 80	BLK 367YA 81	BLK 367YA 90	BLK 367YA 91	BLK 367YA 92
DATE / TIME		06/13/85 10:34	06/13/85 09:01	06/13/85 09:18	06/13/85 09:40	06/12/85 09:55	06/12/85 13:59	06/10/85 00:00	06/11/85 00:00	06/10/85 00:00	06/11/85 00:00	06/11/85 00:00
SAMPLE TYPE	71999 0	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
SAMPLE DEPTH FT	99758A 0	4.00	0.0	4.00	9.00	22.5	6.00	0.0	0.0	0.0	0.0	0.0
SITE TYPE I	99759 0	BORE	BORE	BORE	BORE	BORE	BORE	QCMB	QCMB	QCMB	QCMB	QCMB
INSTALLATION CODE	99720 0	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK	RK
SAMPLE SAMPLING TECHNIQUE	72005 0	S	S	S	S	S	S	G	G	G	G	G
COORDINATE,N/S STP	98392 0	185115	185211	185211	185211	185410	185307					
COORDINATE,E/W STP	98393 0	2185373	2185533	2185533	2185533	2185368	2185169					
MOISTURE %WET WT	70320 0	9.2	7.9	15.1	8.9	20.9	12.7	2.7	2.7	2.0	2.0	2.0
CADMIUM UG/G- DRY	1028 0	<0.500	<0.500	0.800	<0.500	<0.500	1.80	NA	NA	<0.500	NA	NA
CHROMIUM UG/G-DRY	99584 0	12.0	16.0	23.0	13.0	14.0	19.0	NA	NA	14.0	NA	NA
COPPER UG/G- DRY	1043 0	12.0	14.0	22.0	12.0	46.0	18.0	NA	NA	14.0	NA	NA
LEAD UG/G-DRY	1052 0	<16.0	<16.0	<16.0	<16.0	<16.0	27.0	NA	NA	<16.0	NA	NA
ZINC UG/G-DRY	1093 0	35.0	42.0	58.0	<28.0	82.0	67.0	NA	NA	37.0	NA	NA
ARSENIC UG/G- DRY	1003 0	<5.20	<5.20	<5.20	<5.20	<5.20	<5.20	NA	NA	<5.20	NA	NA
MERCURY UG/G-DRY	71921 0	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	<0.070	<0.070	NA
ALDRIN UG/G- DRY	98356 0	<0.500	<0.500	<0.500	<0.500	<0.500	7.34	<0.900		<0.500	<0.500	<0.500
DIELDRIN UG/G-DRY	98365 0	<0.600	<0.600	<0.600	<0.600	<0.600	7.65	<0.300		<0.600	<0.600	<0.600
DDT,PP' UG/G-DRY	98364 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.400		<2.00	<2.00	<2.00
ENDRIN UG/G-DRY.	98369 0	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<0.700		<4.00	<4.00	<4.00
CHLORDANE UG/G- DRY	98361 0	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<1.00		<6.00	<6.00	<6.00

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3115B 367YA 61	3116A 367YA 66	3116B 367YA 67	3116C 367YA 68	3110Y 367YA 72	3113Z 367YA 73	BLK 367YA 80	BLK 367YA 81	BLK 367YA 90	BLK 367YA 91	BLK 367YA 92
DATE		06/13/85	06/13/85	06/13/85	06/13/85	06/12/85	06/12/85	06/10/85	06/11/85	06/10/85	06/11/85	06/11/85
TIME		10:34	09:01	09:18	09:40	09:55	13:59	00:00	00:00	00:00	00:00	00:00
DDE,PP' UG/G-DRY	98363 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300		<0.500	<0.500	<0.500
1,4 OXATHIANE UG/G-DRY	98644 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.300		<0.500	<0.500	<0.500
DIMP UG/G-DRY	98645 0	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<0.500		<3.00	<3.00	<3.00
VAPONA UG/G -DRY	98646 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300		<0.300	<0.300	<0.300
HEXACHLOROCYCLOPENT-ADIENE UG/G-DRY	98647 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00	<1.00
MALATHION UG/G-DRY	98648 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.600		<2.00	<2.00	<2.00
ISODRIN UG/G-DRY	98649 0	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.300		<0.600	<0.600	<0.600
1,4 DITHIANE UG/G- DRY	98650 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.300		<2.00	<2.00	<2.00
DICYCLOPENTADIENE UG/G-DRY	98651 0	<6.00	<6.00	<6.00	<6.00	<6.00	<6.00	<0.300		<6.00	<6.00	<6.00
DBCP(NEMAGON) UG/G-DRY	98652 0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
P-CLPHENYLMETHYL-SULFIDE UG/G-DRY	98653 0	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300	<0.300		<0.300	<0.300	<0.300
P-CLPHENYLMETHYL-SULFOXIDE UG/G-DRY	98654 0	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<0.400		<1.00	<1.00	<1.00
ATRAZINE UG/G-DRY	98655 0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.700		<0.500	<0.500	<0.500
SUPONA UG/G-DRY.	98656 0	<0.900	<0.900	<0.900	<0.900	<0.900	<0.900	<0.500		<0.900	<0.900	<0.900
DMMP UG/G-DRY	98657 0	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<2.00		<3.00	<3.00	<3.00
PARATHION UG/G-DRY	98658 0	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<0.700		<2.00	<2.00	<2.00
P-CLPHENYLMETHYL-SULFONE UG/G-DRY	98703 0	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.300		<0.400	<0.400	<0.400
TRANS-1,2-DICHLORO-ETHENE UG/G-DRY	98687 0	NA	NA	NA	NA	NA	NA	<0.300				
ETHYLBENZENE UG/G-DRY	98688 0	NA	NA	NA	NA	NA	NA	<0.300				
METHYLENE CHLORIDE UG/G-DRY	98689 0	NA	NA	NA	NA	NA	NA	1.14				

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS UNITS	STORET # METHOD	3115B 367YA 61	3116A 367YA 66	3116B 367YA 67	3116C 367YA 68	3110Y 367YA 72	3113Z 367YA 73	SAMPLE ID/# BLK 367YA 80	BLK 367YA 81	BLK 367YA 90	BLK 367YA 91	BLK 367YA 92
DATE		06/13/85	06/13/85	06/13/85	06/13/85	06/12/85	06/12/85	06/10/85	06/11/85	06/10/85	06/11/85	06/11/85
TIME		10:34	09:01	09:18	09:40	09:55	13:59	00:00	00:00	00:00	00:00	00:00
TETRACHLOROETHENE UG/G-DRY	98690 0	NA	NA	NA	NA	NA	NA	<0.300				
TOLUENE UG/G-DRY	98691 0	NA	NA	NA	NA	NA	NA	<0.300				
1,1,1-TRICHLORO-ETHANE UG/G-DRY	98692 0	NA	NA	NA	NA	NA	NA	<0.300				
1,1,2-TRICHLORO-ETHANE UG/G-DRY	98693 0	NA	NA	NA	NA	NA	NA	<0.300				
TRICHLOROETHENE UG/G-DRY	98694 0	NA	NA	NA	NA	NA	NA	<0.300				
M-XYLENE UG/G-DRY	98695 0	NA	NA	NA	NA	NA	NA	<0.300				
MIBK UG/G-DRY	98696 0	NA	NA	NA	NA	NA	NA	<0.500				
DMDS UG/G-DRY	98697 0	NA	NA	NA	NA	NA	NA	<0.300				
BENZENE UG/G-DRY	98699 0	NA	NA	NA	NA	NA	NA	<0.300				
O-AND/OR P-XYLENE UG/G-DRY	98700 0	NA	NA	NA	NA	NA	NA	<0.500				
CARBON TETRACHLORIDE UG/G-DRY	98680 0	NA	NA	NA	NA	NA	NA	<0.300				
CHLOROBENZENE UG/G-DRY	98681 0	NA	NA	NA	NA	NA	NA	<0.300				
CHLOROFORM UG/G-DRY	98682 0	NA	NA	NA	NA	NA	NA	1.03				
1,1-DICHLOROETHANE UG/G-DRY	98683 0	NA	NA	NA	NA	NA	NA	<0.300				
1,2-DICHLOROETHANE UG/G-DRY	98684 0	NA	NA	NA	NA	NA	NA	<0.300				
BICYCLOHEPTADIENE UG/G-DRY	98686 0	NA	NA	NA	NA	NA	NA	<0.300				
DBCP(NEMAGON) UG/G-DRY	98652 Q9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
DBCP UG/G-DRY	98652 H9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
UNK542 UG/G	90024 0						2.29			2.04		
UNK609 UG/G	90066 0			0.589						1.02		1.02

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS	UNITS	STORET # / METHOD	3115B 367YA 61	3116A 367YA 66	3116B 367YA 67	3116C 367YA 68	3110Y 367YA 72	3113Z 367YA 73	BLK 367YA 80	BLK 367YA 81	BLK 367YA 90	BLK 367YA 91	BLK 367YA 92
DATE			06/13/85	06/13/85	06/13/85	06/13/85	06/12/85	06/12/85	06/10/85	06/11/85	06/10/85	06/11/85	06/11/85
TIME			10:34	09:01	09:18	09:40	09:55	13:59	00:00	00:00	00:00	00:00	00:00
UNK635	UG/G	90087 0	13.2	5.21	4.12	6.58		3.44			4.08		4.08
UNK633	UG/G	90085 0	0.661										
UNK579	UG/G	90043 0		0.760									
UNK632	UG/G	90084 0		3.15	1.18	2.19		1.03					
UNK608	UG/G	90065 0		0.434									
UNK629	UG/G	90082 0			0.707								
UNK604	UG/G	90061 0			0.589								
UNK614	UG/G	90070 0				0.658			2.03				
UNK636	UG/G	90088 0											
UNK625	UG/G	90078 0											
UNK613	UG/G	90069 0											
UNK628	UG/G	90081 0											
UNK546	UG/G	90028 0											
UNK577	UG/G	90041 0											
UNK594	UG/G	90053 0											
UNK605	UG/G	90062 0											
UNK598	UG/G	90056 0						0.687					
UNK618	UG/G	90073 0						0.573					
UNK548	UG/G	90029 0											0.306
UNK523	UG/G	90092 0							0.591				

PROJECT NUMBER 84936 0300
FIELD GROUP 367YA
367YAS

PROJECT NAME SECTION 36 RMA
PROJECT MANAGER BILL FRASER
LAB COORDINATOR PAUL GEISZLER

PARAMETERS / UNITS	STORET # / METHOD	3115B 367YA 61	3116A 367YA 66	3116B 367YA 67	3116C 367YA 68	3110Y 367YA 72	3113Z 367YA 73	SAMPLE ID/# BLK 367YA 80	BLK 367YA 81	BLK 367YA 90	BLK 367YA 91	BLK 367YA 92
DATE		06/13/85	06/13/85	06/13/85	06/13/85	06/12/85	06/12/85	06/10/85	06/11/85	06/10/85	06/11/85	06/11/85
TIME		10:34	09:01	09:18	09:40	09:55	13:59	00:00	00:00	00:00	00:00	00:00
UNK533 UG/G	90021 0							0.360				
UNK534 UG/G	90114 0							0.590				
UNK637 UG/G	90089 0							1.19				
UNK527 UG/G	90017 0											
UNK619 UG/G	90105 0											
UNK603 UG/G	90060 0											
UNK624 UG/G	90118 0											
UNK513 UG/G	90116 0											
UNK515 UG/G	90010 0											
UNK516 UG/G	90011 0											
UNK530 UG/G	90019 0											
UNK611 UG/G	90067 0											
UNK581 UG/G	90101 0											

APPENDIX 36-7-C
COMMENTS AND RESPONSES

Shell Oil Company

One Shell Plaza
P.O. Box 2463
Houston, Texas 77252

January 18, 1988

USATHAMA
Office of the Program Manager
Rocky Mountain Arsenal Contamination Cleanup
ATTN: AMXRM-EE: Chief: Mr. Donald L. Campbell
Bldg. E4460
Aberdeen Proving Ground, MD 21010-5401

Dear Mr. Campbell:

Enclosed herewith are Shell Oil's comments on the Draft Final Phase I Contamination Assessment Report, Site 36-7: Solid Waste Burial/Sanitary Pits, Task Number 1, December 1987.

Sincerely,

C. K. Hahn

C. K. Hahn
Manager
Denver Site Project

RDL:ajg

Enclosure

cc: (w/enclosure)
USATHAMA
Office of the Program Manager
Rocky Mountain Arsenal Contamination Cleanup
ATTN: AMXRM-EE: Mr. Kevin T. Blose
Bldg. E4460
Aberdeen Proving Ground, MD 21010-5401

USATHAMA
Office of the Program Manager
Rocky Mountain Arsenal Contamination Cleanup
ATTN: PMSO: Mr. Brian L. Anderson
Bldg. E4460
Aberdeen Proving Ground, MD 21010-5401

BRHM8801801 - 0001.0.0

cc: Mr. Thomas Bick
Environmental Enforcement Section
Land & Natural Resources Division
U.S. Department of Justice
P.O. Box 23896
Benjamin Franklin Station
Washington, D.C. 20026

Mr. Scott Isaacson
Department of the Army
New Federal P.O. Bldg
12th & Pennsylvania N.W., Room 4441
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Ms. Patricia Bohm
Office of Attorney General
CERCLA Litigation Section
1560 Broadway, Suite 250
Denver, CO 80202

Mr. Jeff Edson
Colorado Department of Health
4210 East 11th Avenue
Denver, CO 80220

Mr. Robert L. Duprey
Director, Waste Management Division
U.S. Environmental Protection Agency, Region VIII
One Denver Place
999 18th Street, Suite 500
Denver, CO 80202-2405

Mr. Connally Mears
U.S. Environmental Protection Agency, Region VIII
One Denver Place
999 18th Street, Suite 1300
Denver, CO 80202-2413

Mr. Thomas P. Looby
Assistant Director
Colorado Department of Health
4210 East 11th Avenue
Denver, CO 80220

RESPONSES TO SPECIFIC COMMENTS OF THE SHELL CHEMICAL COMPANY ON THE DRAFT FINAL TASK 1 REPORT SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS

Comment 1: Executive Summary, first paragraph	"The site includes an incinerator used for the disposal of unwanted munitions,..." The only incinerator mentioned in the text of this CAR is the Shell Chemical Company incinerator. However, Shell's incinerator was never used for the destruction of unwanted munitions. Was there another incinerator located at Site 36-7 and, if so, why is it not discussed?
Response:	As noted by Shell, the Shell Chemical Company incinerator was not used for the destruction of unwanted munitions. The sentence has been corrected to state that the incinerator was used for the disposal of contaminated and uncontaminated wastes by Shell and the Army. There is no other incinerator at Site 36-7.
Comment 2: p. 1, second paragraph	"Site boundaries...were changed based on.... interpretation of the 1962 through 1975 aerial photographs". No photographs are listed on page 8 between 1962 and 1975.
Response:	In altering site boundaries, consideration was given to all available information, including aerial photographs of RMA which cover the period from the early 1940's to the present. The description of these photographs has been updated and expanded based on a more complete examination of materials obtained through the discovery process. The subject sentence has been changed to indicate the boundary change was based on available photographic information, historical records, and physical examination of the site.
Comment 3: p. 2, 1.2 Geology	The last sentence of the first paragraph is inconsistent with the depth to bedrock data on page 3.
Response:	The subject sentence has been changed to read that logs from nearby wells and soil borings indicate the alluvial thickness varies from 2 to 22 feet within the site vicinity.
Comment 4: p. 3, 1.3 Hydrology, second paragraph	Wells 36116 and 36117, measured in March 1986, show water table elevations of 5245 and 5339, respectively.

Response: The measurements from these Denver Formation wells may not reflect water table conditions and were not used to generate Figure 36-7-4. Potentiometric maps for the Denver Formation are presented in the Task 4 Initial Screening Report (ESE, 1986, RIC#86238R04). Ground water levels will be further evaluated in the forthcoming Regional Study Area reports.

Comment 5: p. 3, 1.3 Hydrology, third paragraph

Although the report states that no target analytes were detected in Well 25022, downgradient of Site 36-7, MKE data shows benzene was detected in 1986. MKE data also show that other compounds, such as benzene, chloroform, chlorobenzene, DBCP, DCPD, p-chlorophenylmethyl sulfide (CPMS), and mercury, were detected between 1983 and 1986 in downgradient Wells 25021, 25023, and 25024.

Other compounds detected in 1986 in upgradient Well 36082 were chloroform, benzene, chlorobenzene, and DCPD.

Response: As stated in Section 1.3, the data presented are from the Task 4 Initial Screening Program (ISP). Data for Denver Formation Wells 25023 and 25024 have been included in the Hydrology section (see Section 1.3). Well 25023 contained p-chlorophenylmethyl sulfoxide and benzene, but Well 25024 did not contain any target analytes. Well 25021 was not sampled in the ISP. Additional ground water analytical data along with the Phase II soil data for this site will be examined and evaluated in subsequent reports.

Comment 6: p. 6, Figure 36-7-4

Discrepancies exist in interpretations of local ground water elevation contours between Shell, WES and ESE studies.

Response: The referenced discrepancies in ground water contour interpretation have been noted and discussed on several occasions. Efforts to resolve such discrepancies will continue within the context of cooperative agreements among the pertinent parties.

Comment 7: p. 8, first paragraph

In the late 1940's and early 1950's the Army may have utilized this site as a impact area for white phosphorus grenades and rockets. (Deposition of M.C. Lynes VIII pp. 421-423, 431-432).

The reference cited for destruction and disposal of bombs, grenades, etc., at Site 36-7 does not clearly implicate Site 36-7, e.g., some or all of these events could have occurred farther east.

There is no evidence that the area was used as a sanitary landfill prior to 1950. In fact, the reference cited and aerial photographs document sanitary landfilling after 1958. (Also see RLA 009 2699-2701).

The discussion of the history of Site 36-7 is very brief considering the complexity and longevity of this site. Was Wingfield, 1977, RIC#81266R68 the only history source available to the Army for evaluation of this site (other than aerial photographs)?

Response: Revised and updated historical information, based on a full review of information identified during the course of the discovery process, has been inserted in Section 2.0 of the report. This additional evidence indicates that some statements made in the draft final version of this report were based on incorrect or incomplete information. Such statements have been revised or deleted as appropriate (see Section 2.0).

Comment 8: p. 8, second paragraph

Other contaminant assessment reports have relied on Stout RIC#83368R01, HLA RIC#86314P02, and ITECH RIC#86314P01 for aerial photographic interpretation. Why, in this instance, has only Moloney been used?

Other aerial photographs with interpretations by MKE are listed below.

Photograph Date	Description
October 21, 1948	Photograph shows a disturbed area just west of the Section 36 north-south midline and just south of Eighth Avenue. (Colorado Aerial Photo Service Negative DV-5-148, RMK 003-0025, Donnelly Exhibit 28).
June 21, 1950	This photo also shows the disturbed area present in the October 21, 1948 photo.
March 25, 1951	Same as June 21, 1950 photo. (Colorado Aerial Photo Service Negative Number 29-A6).
July 23, 1956	The divided square has nearly faded from view. The North Plants' parking lot has been constructed east of the site. The disturbed area described on earlier photos remains present and new shallow surface scarring is evident

	throughout the site. Changes in part of the site located to the southwest of the Basin A drainage canal are apparent, but these may be vegetative in nature. (Photograph YF-ZR-87, Donnelly Exhibit 36A, RMK 003-0033).
1958	This photo shows that the widespread, shallow surface scarring is no longer evident.
March 30, 1964	In addition to features present in 1958 and 1962, a trench has been excavated in the center of the site.
April 29, 1965	The drainage canal from Basin A has been graded. Several additional roads service both the area north of the "divided square" and the trench which first appeared in March 1964 photo. The area north of "divided square" appears to have materials around the perimeter of a graded area.
April 25, 1970	The Shell incinerator appears immediately southwest of an area covered with unknown materials. Another activity is ongoing northwest of an incinerator, and a furrowed area indicative of possible trenching appears to the northwest. Farther northwest of the incinerator is located a long graded area, running southwest/northeast. (Colorado Aerial Photo/Service, Negative Number 132-360).
October 13, 1973	The long northwest/southwest trending graded area is revegetating as many of the disturbed areas noted earlier photos. (Colorado Aerial Photo Service, Negative Number 139-29).

<u>Response</u>: The aerial photograph descriptions have been updated with photographs from the discovery record (see Section 2.0). The revised interpretations are consistent with the information provided by MKE.

<u>Comment 9</u>: p. 8, 1975 photo description	It should also be noted that with the exception of the Shell incinerator, the site appears inactive and in the process of revegetating.
<u>Response</u>:	The disposal trenches and the dump by the incinerator appear not to be in use in the 1975 photograph but other dump sites are visible in the site (see Section 2.0).
<u>Comment 10</u>: p. 9, first paragraph	The soil classification by <u>Sampson and Baber, 1974</u> should be field-verified.
<u>Response</u>:	Soils encountered during the boring program are visually logged using the Unified Soil Classification System (USCS) according to USATHAMA specifications. These data are available for retrieval and compilation if required for future purposes. New characterizations of RMA soils will be incorporated in future reports when available.
<u>Comment 11</u>: p. 10, second paragraph	Should the penultimate sentence begin "Due to the limited sampling performed by the OTSG study,..", rather than "Due to the small sample size in the OTSG study,...?"
<u>Response</u>:	The sentence has been corrected as suggested.
<u>Comment 12</u>: p. 14, 3.2.3 Geophysical Exploration	Some of the anomalies appear to extend beyond the Phase I Geophysical Survey Boundary (this is noted in the text for Anomaly A). The survey should be extended in a subsequent study to define the limits of all anomalies. Does the geophysical survey boundary cover the site boundary? Site boundary should be shown on Figure 36-7-6.
<u>Response</u>:	Some geophysical anomalies may extend beyond the grid boundaries; e.g., Anomaly A, which is partially derived from the presence of a buried pipeline running through the area. As such, extension of the study area would not further serve the survey's purpose, which was to assist in identifying trenches within the site to enable Phase II borings to be placed more effectively. The geophysical grid does cover the main area of the site, as can be seen by comparing the boring locations shown on both figures as a means of correlating locations without unnecessarily confusing the presentation.
<u>Comment 13</u>: p. 17, last paragraph	The association of Anomaly D with the Shell Chemical incinerator should be explained, i.e., how was Anomaly D "produced" by the incinerator?

Response: The geophysical methods used measure variations in electromagnetic fields. Therefore, they are sensitive to the presence of metallic objects both under and above ground. As explained in the geophysical investigation report, the proximity of fence lines, power lines, or metal structures such as the incinerator, will produce a measurable response or "anomaly" on the instrumentation. Considerable interpretive effort is required by experienced personnel to evaluate the implications of the raw data from the various instruments. Only then can judgments be made as to which responses indicate possible trenches and which are due to potential interferences, such as the incinerator.

Comment 14: p. 35, first paragraph under 3.2.5

"Higher concentrations of bare [sic] metals were found in bedrock samples, but were consistent with values typically found in the Denver Formulation [sic]".

This general statement is repeated in many Phase I CARs, however, to Shell's knowledge, no data has ever been provided which describes the typical levels of bare [sic] metals in the Denver Formations. Such data should be provided.

Response: As stated in the Introduction to the CARs (ESE, 1986a), the background concentrations of metals used to create the indicator ranges are valid only for soils and not for weathered or consolidated bedrock. Shales or claystones are often enriched in these metals since the metals are adsorbed to clay minerals during the formation of shales (Connor and Shacklette, 1975). A further evaluation of background metal concentrations in Denver Formation materials will be presented as part of the Regional Study Area reports. This evaluation will be conducted utilizing Phase I and Phase II data to provide a more comprehensive and statistically valid database.

Comment 15: p. 36, fourth paragraph

In the second sentence, either an explanation should be provided as to why zinc in Boring 3115 (which was drilled into "...a mound of material, possibly fill...") may be related to the incinerator or this sentence should be deleted.

Response: The sentence has been deleted.

Comment 16: p. 36, fifth paragraph

See comment 13.

Response: See response to comment 13.

Comment 17:
p. 33, 3.3 Phase II Survey

Shell's comments on Site 36-17: Complex Disposal Activity, as contained in Shell's November 19, 1987 response, with respect to investigating complex disposal sites containing numerous trenches, pits and mounds, apply as well to Site 36-7, specifically comments 1, 21, 23, 24, 25, 26, 27, 28, and 31 for the November 19, 1987 letter.

Response:

The referenced comments made in the November 19, 1988 Shell letter with respect to investigating complex disposal sites have been responded to and are appended to the Site 36-17 CAR. The investigation of 36-17 is ongoing, and the field techniques have proven very successful, allowing selective sampling of pre-designated areas based on geophysical results which were very accurate. This approach offers an efficient method of obtaining useful information in a situation where high investigation costs and marginal data are too often the result of poor sampling plan design.

Comment 18:
p. 38, Figure 36-7-8

Why aren't the mounds near borings 3110, 3106, and grid marker U6 being investigated?

How were the locations of the additional borings southwest of boring 3114 determined?

Response:

Photographic and physical evidence indicates the various mounds found in this area are spoil piles from excavations (see Section 2.0). The large mound south of Boring 3115 will be sampled as a precaution. The area southwest of Boring 3114 was used in recent years for surface dumping of waste materials such as wood and cardboard, which was since removed (see Section 2.0). The borings are designed to check for residual contamination from this activity. One of the borings was incorrectly located in drafting the figure and has been adjusted.

Comment 19:
p. 39, fourth paragraph

In the last sentence, it should be noted that sampling depths of borings in pits are relative to the trench bottom, per legend on Figure 36-7-8.

Response:

The sentence has been changed as follows: "The borings in the pits will be drilled to 5 ft and sampled at the 0-1 and 4-5 ft intervals as measured from the pit bottom.

RESPONSES TO SPECIFIC COMMENTS OF THE COLORADO DEPARTMENT OF HEALTH ON THE DRAFT FINAL TASK 1 REPORT SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS

Comments were not received from the Colorado Department of Health prior to the distribution of this report. A period of 30 days was extended to CDH to furnish their comments.

The following comments by the Colorado Department of Health and Shell Chemical Company were on the previous draft final version of this report that was submitted to MOA parties on April 29, 1986. Because of substantial revisions to the original report, a subsequent draft final report (Version 2.3) was submitted to MOA parties for comment on December 29, 1987.

COLORADO DEPARTMENT OF HEALTH

Richard D. Lamm
Governor

Thomas M. Vernon, M.D.
Executive Director

May 15, 1986

Mr. Donald Campbell
Office of the Program Manager
AMXRM-EE, Bldg. 4585
Aberdeen Proving Ground
Maryland 21010-5401

Dear Mr. Campbell:

Enclosed are our comments on the Phase II Section 36 Draft Final Source Reports, 36-1, 36-4, 36-7 and 36-15 April, 1986 Task #1. We look forward to discussing these comments with you and your staff in the next Onpost MOA Task Group meeting shceduled for June 3, 1986 at RMA.

If you have any specific questions concerning the comments you would like to discuss in advance of the meeting, please contact Mr. Chris Sutton with the Water Quality Control Division.

Sincerely,

Tom Looby

Thomas P. Looby
Remedial Program Director
Office of Health Protection

TPL:ts

Enclosure

cc: Robert Duprey, EPA
Howard Kenison, AGO
Bob Lundahl, Shell Chemical Co.

4210 EAST 11TH AVENUE DENVER,COLORADO 80220 PHONE (303) 320-8333

**SPECIFIC COMMENTS OF
THE COLORADO DEPARTMENT OF HEALTH ON THE
DRAFT FINAL TASK 1 REPORT
SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS
(APRIL 1986 VERSION)**

Comment 1: p. 36-7-2	This figure did not reproduce well. It is very difficult to read boring designations.
Comment 2: p. 36-7-3	Please provide the geologic cross-section described as a figure in this report.
Comment 3: p. 36-7-6	Was any attempt made to locate borings within the identified trenches or were the borings randomly spaced?
Comment 4: p. 36-7-10	Why was the protocol for organic volatiles changed from analyzing all intervals except the shallowest to only the deepest interval being analyzed in 5 predetermined borings? The disposal of volatile organic wastes in old landfills was a common practice as evidenced by source area 4-2.
Comment 5: p. 36-7-10	Phase II borings must be constructed in the vicinity of borings 3107 and 3133 to evaluate the 200 ppm HNU readings obtained from these borings. Why were no volatiles analyzed in either of these borings in Phase I?
Comment 6: 36-7-10	No volatiles analyses were conducted in the westernmost borings 3122-25. Those isolated source areas should be evaluated in Phase II for volatiles to correct this oversight.
Comment 7: 36--7-13	Please correct Table 36-7-3 to show when no analysis was conducted and when no data is reported from the lab.
Comment 8: 36-7-18	Figure 36-7-5, boring 3111 A should show cadmium at 5.1 ppm.
Comment 9: 36-7-19	Table 36-7-4 shows nontarget organic solvent or oil contamination in borings 3105, 3106, 3107, 3108, 3111, 3112, 3113, 3114, 3115, 3116, 3118, 3119, 3121, 3122, 3123, and 3124. Yet the report concludes that there is no need to include any nontarget compounds in the Phase II work. It appears that nontarget compounds will not be included in Phase II work at any source. Please comment.

Comment 10: 36-7-19

Again, a substantial number of organic compounds are identified in the blanks. Please explain the effect this has on the quality of the data produced in Phase I and what steps are being taken to address the problem.

Comment 11: 36-7-26

Phase II borings should extend into the saturated zone beneath the landfill to identify if the source is contributing to the ground water degradation within Section 36. These borings should be placed in the vicinity of the elevated HNU readings and in areas where nontarget solvents or oils were identified.

Comment 12: 36-7-27

Toluene was identified in borings 3106, 3107, 3112, 3119, 3122, and 3123. Toluene is a very common organic solvent contaminant of ground water in sanitary landfills operated before 1980. Phase II investigations should include the solvent as an analyte for this source.

Comment 13: 36-7-27

The borehole 3124 showed "significant" metals contamination in the D and E intervals. Arsenic in 3124 D was 10 ppm and 17 ppm in 3124E. Copper, lead, zinc, and mercury also exceeded the Army/EPA proposed indicator levels, but the conclusion in the report states there were "no significant metals concentrations" detected. Some Phase II metals work is needed in this area.

Comment 14: 36-7-27

The circular portion of 36-7 near 36-8N shows "significant" contamination in the B, C, and D intervals of boring 3122. Organic (DIMP) and inorganic contaminants (copper, chromium and mercury) were identified in the deeper intervals at or above Army/EPA indicator levels. Using CDH indicator levels, lead, zinc, and cadmium would be added to the list. Since only 2 borings were completed with this source area, Phase II borings are justified. Phase II borings must extend into the saturated zone within the source to determine if the contamination is migrating from the source to ground water or vice versa as was hypothesized in the report.

Comment 15: 36-7-28

The conclusion that the source area southeast of the main 36-7 area is "free of contamination" needs further explanation. Since trench disposal was identified in this area, the vertical borings in the unsaturated zone would not be expected to find contamination unless the boring actually penetrated a trench. The location of boring 3120 was relocated due to suspected shallow buried metal. It may have therefore been moved outside a disposal trench. Nontarget solvent and oil was detected in three of the four borings within this area. The report should state that the borings constructed did not show target compound contamination in excess of

Army/EPA indicator levels except for copper and lead in the deepest sample interval.

Comment 16: 36-7-28

We do not concur that the northern half of the primary source area should be eliminated from Phase II investigations.

Comment 17: 36-7-28

A substantial effort should be made to locate the Phase II borings within the defined trench boundaries. Several Phase II borings should extend into the water table up and downgradient from the source area to assess the contaminant contribution to the saturated zone from this area.

Comment 18: 36-7-30

Phase II analysis must also include volatile organic as described previously, DIMP, mercury and the nontarget compounds, oil and toluene.

Comment 19: 36-7-30

Explain the basis for reducing the estimates of total volume of the source area.

Shell Oil Company

One Shell Plaza
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June 10, 1986

USATHAMA
Office of the Program Manager
Rocky Mountain Arsenal Contamination Cleanup
ATTN: AMXRM-EE: Chief: Mr. Donald L. Campbell
Bldg E4585, Trailer
Aberdeen Proving Ground, MD 21010-5401

Dear Mr. Campbell:

Enclosed herewith are Shell's comments on the draft final copies of Contamination Assessment Reports for Sources 36-1,-4,-7, and -15. In addition to these specific comments, the general comments on methodology and data presentation, which were made in Shell's April 7, 1986 response to Section 36 Contamination Assessment Reports, apply as well to these reports.

Very truly yours,

C.K. Hahn

C. K. Hahn
Denver Site Project

RDL:ajg

Enclosure

cc: USATHAMA
Office of the Program Manager
Rocky Mountain Arsenal Contamination Cleanup
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Mr. Thomas Bick
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RLWRC16101

cc: Major Robert J. Boonstoppel
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RIUW9616101

SPECIFIC COMMENTS OF THE
SHELL CHEMICAL COMPANY ON THE
DRAFT FINAL TASK 1 REPORT
SITE 36-7: SOLID WASTE BURIAL/SANITARY PITS
(APRIL 1986 VERSION)

Comment 1: p. 36-7-11 third paragraph	The procedure described of analyzing composites of aliquots of samples taken each day seems questionable in that dilution of contamination could occur, masking its presence. Why are chemical agents treated differently than other suspected or anticipated contaminants? The sensitivities of the RMA Laboratory tests for chemical agents should be incorporated.